

# Multifamily Retrofit Conservation Programs:

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## Customer Service Measures

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July 1998

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Evaluation Unit  
Energy Management Services Division

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## Executive Summary

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This report describes the results of two telephone surveys about participant satisfaction with the Multifamily Conservation Programs operated by Seattle City Light (SCL). The Wave 1 survey was conducted with all participants who had received a building audit in 1993 or 1994 and who had completed work on the recommended weatherization or lighting projects during January through June 1994. The Wave 2 survey was conducted with selected participants who had completed work on the recommended weatherization or lighting projects during July through December 1994.

This report also describes the results of a third telephone survey about changes at multifamily residences that could influence the use of energy. The subjects were non-participants and participants in Seattle City Light's Multifamily Conservation Programs during the years 1986-1992. The 1995 Measures Survey was performed to collect data for analysis in the Multifamily Longitudinal Impact Evaluation. A consultant fielding service completed telephone interviews with 332 building owners and property managers to collect information about changes in buildings, occupancy, appliances, and measures (apart from program measures) which might affect energy usage over the time period extending from 1987 through 1994.

Chapter 1 provides a more extended introduction to this report, along with an overview of the program and participating SCL customers. Chapter 2 describes the survey methods, and a lengthy Chapter 3 presents the results from the three surveys. The remainder of this Executive Summary is drawn from Chapter 4, where the implications of major findings are drawn together and suggestions for action are made. Following are the key recommendations that follow from the survey findings.

### Policy and Direction

- The EMSD director and Manager of Community Conservation should provide kudos to the Seattle Conservation Corps and SCC supervisory staff. The kudos should recognize SCC's excellent work installing showerheads for the Multifamily Conservation Programs while achieving their core mission of employment service to their client-workers. Appropriate recognition might also be directed to executives in Seattle City Light and Seattle Public Utilities, as well as interested parties in the Executive and Legislative branches of City government.

- Seattle City Light (SCL) and the Department of Housing & Human Services (DHHS) must continue to explore ways to support the 'affordable housing' agenda of the City of Seattle, while maintaining and improving the energy efficiency of existing building stocks. DHHS currently operates weatherization programs for low-income clients in single-family and multifamily buildings throughout Seattle. Eventual restructuring of the DHHS low-income and SCL non-low income programs may become necessary in the long-term future. This will open up issues formerly tied to the low-income programs, such as funding or financing for rehabilitation, remodelling, and repairs, as well as code compliance and efficiency improvements.

### **Program Re-Design**

- In 1998, SCL should begin to offer "early action" monetary incentives for the Multifamily Conservation Programs. Customer delays are the source of SCL program operators' interest in implementing an incentive paid specifically to encourage customers to act within 30 days of receiving contractor bids. The intent is to even out associated workloads throughout the calendar year for SCL staff as well as contractors.
- Beginning in 1998, SCL should de-emphasize the loan program, modifying program provisions to encourage increased use of the early-payment discount option, to reduce the proportion of loans carried by the City for multifamily conservation projects.
- Where window sills have deteriorated, SCL should consider how rehabilitation could be incorporated into the 1999-2000 non-low income program to increase the quality of window retrofits, the building stock, and ultimately the satisfaction of building owners. This is now accomplished at DHHS by merging SCL funds (for conservation measures) with rehabilitation funds from State sources and other agencies. The two City Departments should also consider the extent to which a process which emphasizes competitive (low) bids has contributed to post-program window problems in the Standard-Income Program.
- By the year 2001, the Utility should consider developing a new kind of spot-replacement rebate program that could help homeowners and multifamily building owners to re-fit high-efficiency windows into openings where individual aluminum-framed windows have failed. As a rebate alternative, lending institutions are becoming more active in offering below-market rate energy loans, with money now readily available. The design of such a streamlined new-generation program would be challenging, to ensure cost-effectiveness, but it is time the Utility considered next steps as the lifetimes tick away on early-sponsored window retrofits.

- The Utility needs established, built-in program processes and re-contact intervals to be invoked during times of stress for contractors. These processes would place a high priority for program staff to “take up the slack” for contractors, by staying in close contact with customers and smoothing the way. When contractors fail to keep up communications, program staff can explain the reason for delays, assure customers that their project is important, and that the Utility is keeping watch on the project.
  - First, data should be developed in 1998 for each project on the length of intervals between key dates, such as from contract signature to passed inspections. The length of key intervals for a groups of recent projects undertaken by each contractor can be made available to staff and customers at the time new bids are being reviewed. This may enable customers to select contractors who are more on target for keeping their projects moving, and may help reduce overloads for popular contractors.
  - A second remedy, applied to tardy contractors, is to assess automatic failures (“auto-fails”), which occur when a passed inspection does not take place within 90 days of contract signature and when no extension request has been submitted by the contractor. This remedy, which can mean monetary fines, is periodically implemented in other Seattle City Light conservation programs. It can be an effective incentive to contractors to keep jobs on schedule, thus preserving important profit margins.
- Multifamily building personnel (whether owner, property manager, or resident manager) who are responsible for purchasing and installing replacement lights should periodically receive literature on operations and maintenance, as well as sources of re-stock lamps.
  - The programs should consider rebating a limited supply of replacement lamps with each project. Alternatively, each completed project should be enrolled in a follow-up program which contacts building management at set intervals to prompt proper maintenance and provide updated resupply information.
- The Utility should consider devising a strategy to encourage bulk replacement of all electric water heater tanks in multifamily buildings, rather than individual spot replacements.
- Common-area (coin-operated) laundries in multifamily buildings may provide a good target for the WashWise program in 1998, based on water and waste-water (sewer) savings to owners, who typically pay these master-metered bills. Refrigerators, in-unit laundries, and electric dish washers also present a potential target for Utility programs designed to encourage the installation of high-efficiency models.

**Ongoing Program Improvement**

- City Light and DHHS should continue to publicize the availability of qualified WBE/MBE contractors to program participants.
- Both Multifamily Conservation Programs need to continually monitor the quality of information customers receive regarding measures proposed for installation, whether the information is provided by contractors or program staff. The goal is to assure that all customers receive information on cost and quality that they perceive to be excellent.
  - Program operators should provide participating owners with a written, as well as verbal, description of the expected timeline for receiving their lighting measures. This timeline would clearly state that materials will not be ordered by the contractor until after the contract has been signed by all parties and written authorization has been received by the contractor.
  - Program staff should continue to ensure that contractors routinely offer customers the opportunity to view sample books of efficient lighting products that qualify for program incentives. Program staff should especially draw the attention of each owner to, and help them understand, the product 'cut' sheets.
- The Utility might consider investigating the economics of offering a new generation of vinyl replacement windows, at some future time, to customers who participated in the Multifamily Conservation Programs in 1986-1990 when aluminum windows were sponsored.
- Seattle City Light needs to develop a strategy for following-up on specific buildings receiving the current generation of vinyl window products, to determine whether problems observed in 1991-1992 windows have "shaken out" as high-efficiency ( $U \leq 0.40$ ) products matured. A strategy should also be developed for follow-on services to 1997-1998 customers.
  - The Utility should pursue the question of why participants in the 1991-1992 Low-Income Program volunteered statements on far fewer post-installation problems with windows. SCL program staff feel that in recent years the rate of warranty replacements for vinyl windows has been significantly lower than for the preceding aluminum and early-generation vinyl windows. This hypothesis invites testing.

- Seattle City Light should consider a strategy to follow up on specific buildings receiving post-program replacements, to find out whether the new windows actually were “less efficient,” as some owners and managers perceive them. Perhaps a focus group of DHHS and SCL program staff should address the issues of rehabilitation and window installation methods. This group could also compare staff insights into customer perceptions about the presence or absence of window problems.
- While customers may tolerate a long wait for program services, it is clearly not desirable. To optimize the satisfaction of participants in the Multifamily Conservation Programs, reducing the waiting period for services is a major action that the program operators could take to improve the program.
- The Utility should seek out multifamily participants via the Energy Efficient Water Heater Program (EEWHRP). The Utility may also want to note water heater replacement dates in the Conservation Tracking System, to ensure that future replacements (when measure lifetimes expire) are also made with high-efficiency equipment.
- Follow-up activities could be made easier by use of the new Conservation Tracking System, which can be customized to routinely produce the appropriate documents at a set time after program completion. In the meantime, it is important that the Contracts Units begin mailing out reminders and calling former Multifamily Program customers about their one-year contract option.





## 1. Introduction

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### 1.1 Overview of the Report

This report describes the results of two telephone surveys about participant satisfaction with the Multifamily Conservation Programs operated by Seattle City Light. The Wave 1 survey was conducted with all 27 participants who had received a building audit in 1993 or 1994 and who had completed work on the recommended weatherization or lighting projects during January through June 1994. The Wave 2 survey was conducted with 51 of the 69 participants who had received a building audit in 1993 or 1994 and who had completed work on the recommended weatherization or lighting projects during July through December 1994.

This report also describes the results of a third telephone survey about changes at multifamily residences that could influence the use of energy. The subjects were non-participants and participants in Seattle City Light's Multifamily Conservation Programs during the years 1986-1992. The 1995-1996 Measures Survey was performed to collect data for analysis in the Multifamily Longitudinal Impact Evaluation. A consultant fielding service completed telephone interviews with 332 building owners and property managers to collect information about changes in buildings, occupancy, appliances, and measures (apart from program measures) which might affect energy usage over the time period extending from 1987 through 1994.

The Customer Satisfaction Surveys, Wave 1 and Wave 2, provide a snap-shot of satisfaction with program measures and processes within the first year of program participation. The 1995-1996 Measures Survey was performed primarily to collect data for analysis in the Multifamily Longitudinal Impact Evaluation. However, key data were gathered in this survey which address the quality of program measures as perceived by program participants after the passing of several years, in some cases up to a decade later. The Measures Survey thus provides a complement to the shorter-term view of the two Customer Satisfaction Surveys.

This chapter provides a brief overview of the program and the SCL customers who are eligible to participate. Chapter 2 describes the survey methods. Chapter 3 presents the results from the three surveys. It gives the major findings from the measurement of overall satisfaction, as well as satisfaction

with specific aspects of the program. It details the major findings for satisfaction with each of the program's weatherization measures: efficient-flow showerheads, insulation, windows, and common-area lighting. The final section of Chapter 3 provides findings about changes over time in occupancy and building square footage; the acquisition, replacement, and disposal of energy using equipment; and the timing of these actions. Chapter 4 recapitulates implications of the major findings, adds some discussion, and recommends actions on each of the areas of concern brought out by the three customer surveys.

One appendix accompanies this report. Appendix A contains the survey instruments implemented in the Customer Satisfaction Survey and the Measures Survey interviews. A second technical appendix (B) appears in a separate binding; it contains a complete set of frequency distributions for each of the program groups, and selected cross-tabulations. A single reference copy of Appendix B is kept in the Evaluation Unit files at Seattle City Light.

## **1.2 About the Program**

The Multifamily Conservation Programs (*MFCP*) began in 1986. They were preceded by a 15-building research and demonstration project in 1985. The Multifamily Conservation Programs provide financial and technical help to owners of apartment buildings with electric space heat. The types of measures that the program provides increase the efficiency of building insulation, hot water, and lighting end uses.

Seattle City Light offers three programs to retrofit existing multifamily buildings with these measures. The Low-Income Multifamily Program is funded by Seattle City Light and administered by the Department of Housing and Human Services; it offers the full range of measures. The Multifamily Conservation Program for standard (non-low) income customers is funded and operated by SCL, also offering the full range of efficiency measures. The Multifamily Common-Area Lighting Program, added in 1993, provides lighting-only measures to buildings not eligible for weatherization upgrades.

The Wave 1 and Wave 2 surveys cover the latter two components of the Multifamily Conservation Programs: whole-building retrofits of buildings occupied by standard-income tenants (sometimes called the Standard-Income Program); and buildings receiving only retrofits of common-area lighting, without regard for tenant income eligibility (the Multifamily Common-Area Lighting Program). Whole building retrofits of buildings with low-income tenants (the Low-Income Multifamily Program) were not addressed by the surveys in this report. Survey 3 on measures and building changes covers all three components of the Multifamily Conservation Programs, along with matching control groups.

The typical multifamily building retrofitted with weatherization measures through this program has five or more units and was constructed prior to 1980 when new energy efficiency building codes were adopted in the Seattle area. Participant buildings receiving weatherization measures (Standard-Income whole-building participants) usually have electric space and water heat, are three stories or less, and are not

condominiums. Standard-Income Program conservation participants receive a 10 year, zero-interest loan with a five year deferred payment and a 50% discount for payment within the first year.

In contrast, participant buildings receiving only Common-Area Lighting Program modifications (lighting-only participants) can have either electric or gas space heat, can be relatively new (i.e. built after 1980), and can include condominiums. The Common-Area Lighting Program pays for up to 70% of the installed measure cost, and offers a 70% discount for up-front payment.

### **1.2.1 PROGRAM MEASURES**

The available conservation measures in the Multifamily Conservation Programs include: double-glazed replacement or conversion windows, attic or flat roof insulation, under-floor insulation, wall insulation, caulking and weather-stripping, efficient-flow showerheads, water heater wraps and temperature setbacks, pipe and duct wraps, and common-area lighting modifications. Glass-only window conversion and storm window retrofits have not been allowed since 1992 under NFRC (National Fenestration Rating Council) requirements. The actual measures installed through the program depend upon the condition of the building, feasibility and the cost-effectiveness of the recommended measures, and the owner or building manager's preferences.

The active life-time of measures is expressed in terms of the average residual life, or the point at which approximately 50% of measures would have been retired due to failure. Failure can be physical, but can also reflect early removals due to remodeling or renovation. The active life-time of conservation measures installed by the Multifamily Conservation Programs is assumed to be 30 years for dwelling-area measures (in the whole-building programs) and 16 years for common-area lighting (in all three programs).

### **1.2.2 POPULATION SERVED**

Owners of multifamily buildings with predominantly low-income tenants, from 1986 through 1990, were referred to the Department of Human Resources (DHR) for weatherization by a program jointly administered with and funded by Seattle City Light. In 1991, the Low-Income Program was transferred to the Department of Community Development (DCD); and in 1992 it was incorporated into the Department of Housing and Human Services (DHHS). Participating building owners receive a full-cost grant, conditional upon agreement by the owner to freeze rents for a year and not to raise rents due to conservation measures for a period of four more years (this part of the covenant was changed to two years, beginning in 1998). Owners of these buildings qualify for weatherization grants if two-thirds or more of the building tenants meet low-income eligibility criteria.

In the Low-Income Program, public contractors are selected by the program and assigned to individual buildings to install the measures, while DHHS manages and pays the contractors. The Low-Income Program began to install common-area lighting measures in 1988. Competitive bidding among contractors was implemented for a limited number of projects during 1995 in an effort to reduce costs. Competitive bidding will be required for all DHHS multifamily projects in 1996.

Building owners served by Seattle City Light's Standard-Income Program with measures that include weatherization qualify for a 10-year, zero-interest loan, with five-year deferred payment and a 50% discount for first-year payoff. In 1996 the period on this loan will be reduced to 6 years with the first year deferred. A 50% discount for payoff during the first years will remain in effect.

In the Standard-Income Program, private contractors, selected by the individual building owners or property managers, install the measures while Seattle City Light manages and pays the contractors. In 1987 through 1995, the BPA continued to reimburse some weatherization costs for low-income buildings, and in 1995 once again participants in all three programs benefited from BPA funds.

Beginning in 1993, Seattle City Light began to offer financial and technical help for common-area lighting modifications in buildings not likely to receive whole-building measures. These include oil and gas heated buildings, condominiums of all heat sources, and buildings constructed after the double-glazing code went into effect in 1980. The Common-Area Lighting Program pays for up to 70% of the installed measure cost, and offers a 70% discount for up-front payment. To date, no participants in this group have opted to take the 10-year, zero-interest loan instead; the loan option will be eliminated beginning in 1996.

Partial funding has been received from the Bonneville Power Administration (BPA) through its regional Energy Buy Back (EBB) program in 1986-1991, and through the Weatherwise funding program in 1991-1993. In 1986, the BPA reimbursed a percentage of weatherization costs, resulting in lower loan balances for standard-income building owners and defraying some program costs for low-income building grants. A new Targeted Acquisition contract was signed in March 1993 between Seattle City Light and the Bonneville Power Administration. Under this contract, the BPA funded measures installed by the Common-Area Lighting and Standard-Income (whole-building) Programs. Funding continued under the BPA Weatherwise program for measures installed by the Low-Income (whole-building) Program. Funding provided by the BPA via the Third Party Financing Agreement began in June 1994.

At the end of 1991, in the City Light service area there were 3,164 electrically-heated multifamily buildings built before 1980 that contain five or more units, for a total of 63,281 apartment and condominium units. In 25% of the buildings, at least two-thirds of the residents have incomes at or below 125% of the federal poverty level guidelines. Owners of these buildings qualify for weatherization grants through the DHHS

Low-Income Multifamily Program; owners of the other 75% of buildings qualify for Seattle City Light's (standard-income) Multifamily Program.

The eligible population for the Multifamily Conservation Programs in 1991 thus included about 2,373 standard-income buildings (47,461 units) and 791 low-income buildings (15,820 units). Seattle City Light's goal is to serve 29,426 standard-income units or 62% of the market pool with weatherization measures.

In addition, there are about 2,632 buildings (52,646 units) that were built since 1980, are condominiums, or have nonelectric (gas or oil) space heat. The pool for common-area lighting measures has grown since 1991 with increasing new construction activity.

### **1.2.3 PROGRAM PROCESSES**

The Multifamily Conservation Program for standard-income buildings is conducted in seven stages:

- Stage 1. The building owner applies to the program and is entered on a waiting list.
- Stage 2. Seattle City Light staff perform an audit of the building and recommend measures.
- Stage 3. Building owners solicit bids from qualified contractors in a group bidding process.
- Stage 4. SCL staff review bids with the building owner.
- Stage 5. The building owner or manager selects the successful bidder and signs work contracts.
- Stage 6. SCL staff serve as the general contractor and monitor the work as measures are installed.
- Stage 7. SCL staff perform a final inspection of the completed job, establish warranties, pay off contractors, and set up customer loan repayments.

For weatherization projects, this process typically takes up to eight months from start to completion. For the common-area lighting projects, the process is shorter, usually requiring two to four months to complete.

In the Multifamily Common-Area Lighting Program, during 1993-1995, lighting trade allies generated the projects brought to Seattle City Light for program contracts. The Utility's role was indirect in the early years. In 1996-1997, however, SCL staff have generated the project leads and are first out on each common-area lighting job, following stages similar to those described above. Low-income projects are referred to this program if lighting-only measures are required. The Common-Area Lighting Program has operated without waiting lists (Stage 1) in 1996-1997.

The Low-Income Multifamily Program, during 1986-1994, collapsed Stages 2-5 in one process, with the Department of Housing and Human Services assigning projects to pre-approved contractors. This changed in 1995-1997 as the program moved toward a model similar to the Standard-Income Program, with contractors bidding competitively on whole-building jobs. Stage 7 is similar except there are no loans or repayment of weatherization grants.

#### **1.2.4 ABOUT THIS STUDY**

The Wave 1 survey was conducted with all 27 program participants, of which 8 received whole-building measures and 19 installed lighting-only measures. The Wave 2 survey was conducted with 51 of the 69 program participants, 23 having received whole-building measures and 28 having installed lighting-only measures. Survey 3 on measures was conducted with 270 program participants and 70 non-participants. They included 192 standard-income buildings receiving whole-building measures, 51 similar low-income buildings, and 27 buildings where lighting-only measures were installed. They were matched by non-participant control groups of 24, 21, and 15 buildings, respectively.

The Wave 1 and Wave 2 surveys asked participating owners/managers to report on their overall satisfaction with the program, as well as their satisfaction with the specific components of the program process. Specific components included the length of time they spent on the waiting list, the timeliness of the process once their participation was initiated, the contracting process, the financing options and contracts provided by SCL, the convenience of participation, their interactions with SCL staff who were administering the program, and the energy efficiency measures that were installed. Participants are also asked how they became aware of the program and their reasons for participating. The key findings from each of the questions are presented in Chapter 4.

Survey 3 asked building owners/managers to report on changes at the residences that could influence the use of energy. The questions covered actions that may have affected tenant dwelling (residential) meters as well as the common area (commercial) meters. The collected data included: change in the number of residential units at the multifamily building; changes in the square footage at the site; and changes in common-area energy-using functions. Building contacts were also questioned about the acquisition, replacement, or removal of appliances such as clothes washers, clothes dryers, dishwashers, water heaters, and other major electric using appliances. Finally, contacts were asked about changes in the building's windows, showerheads, and insulation of walls, ceilings, and floors. This report concentrates on the key changes reported, and the numerous open-ended responses about the quality of program-installed measures.

## 2. Survey Methods

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### 2.1 Three Telephone Surveys

Seattle City Light conducted two telephone surveys during Fall 1994 through Winter 1994-1995. The subjects were owners or property managers of multifamily residential buildings that participated the two Multifamily Conservation Programs operated by Seattle City Light. Debra Tachibana of the Evaluation Unit designed the survey questionnaire, in consultation with program staff and management. Staff who participated in the survey development and reviewed the findings include: Ken Katayama (field manager), Bill Durland, Jim Evans, Lois Fulwider, Miale Jose, Eugenia Morita, Terry Takeuchi, and Marilou Trias.

Seattle City Light also conducted a third telephone survey in Winter 1995-1996. The subjects were non-participants and participants in all three Multifamily Conservation Programs during the years 1986-1992. Debra Tachibana designed the survey instrument, in conjunction with Alan Fields, a consultant (Regional Economics Research, Inc.) who developed multiple linear models for a longitudinal impact evaluation of the whole-building Multifamily Conservation Programs.

### 2.2 Survey Samples

**Wave 1:** The Customer Satisfaction Survey, Wave 1, was implemented with owners and managers of all 27 buildings that participated in the Multifamily Conservation Programs during the first and second quarters of 1994. These participating buildings had received a City Light building audit in 1994 (1993 or 1994 for lighting-only projects) and the contractors completed installation work on their weatherization and/or lighting projects during January through June 1994. The survey interviews were conducted by a work/study project aide in the Evaluation Unit, Energy Management Services Division, Seattle City Light.

**Wave 2:** The Customer Satisfaction Survey, Wave 2, was implemented with owners and managers of 69 buildings that participated in the Multifamily Conservation Programs during the third and fourth quarters of 1994. These participating buildings had received a City Light building audit in 1994 and the contractors completed installation work on their weatherization and/or lighting projects during July

through December 1994. The survey interviews were conducted by a consulting firm, HBRS, Inc., which provided survey fielding and analytical services.

**Survey 3:** The Measures Survey was implemented with owners and managers of 435 buildings, of which 343 participated in the Multifamily Conservation Programs during the years 1986 through 1992, and 92 were matched non-participants. The survey interviews were conducted by a consulting firm, Hagler Bailly Consulting, Inc. (successor to HBRS, Inc.), which provides survey fielding and analytical services.

### 2.2.1 SAMPLING PROCEDURES

**Waves 1 & 2:** All buildings (or projects, for the lighting-only program) completing the Multifamily Conservation Programs during January through June 1994 were included in the Wave 1 survey. In the Wave 2 survey, if an owner or manager had participated at more than one site during 1994, an interview was completed for one location, and the other was eliminated from the sample. Low-Income Program participants were not included in either wave. Ten attempts were made to complete all sample points.

Evaluation Unit staff prepared all contact information (building data, contact names and telephone numbers) from manual files of the Multifamily Conservation Programs. Calling for Wave 1 took place from August 31 through October 3, 1994, using a City Light work/study project aide trained by the evaluator. Calling for Wave 2 took place from January 25 through March 3, 1995, using two experienced HBRS, Inc., interviewers and computer-assisted telephone interviewing (CATI) software. Up to ten attempts were made to reach each sample building contact.

**Survey 3:** Seattle City Light provided a building sample listing to the survey fielding consultant. It contained telephone numbers for building owners or property managers of 435 multifamily buildings: 343 program participants and 92 non-participants. The participant sample represented 72% of the buildings weatherized in 1986-1992 by Seattle City Light's Multifamily Conservation Program for standard-income buildings, and was 59% of buildings weatherized in 1991-1992 by the SCL-funded Low-Income Multifamily Program, operated by the Department of Housing and Human Services (DHHS). All projects (100%) served in 1993 by the Multifamily Common-Area Lighting Program (some with multiple buildings per site) were surveyed. Across the three participant groups, the buildings sampled represented 71% of those completing installation of program measures during the study years.

Control groups were defined for each subpopulation of participants: standard-income, low-income, and qualified for common-area lighting measures only. Non-participants were drawn from control groups designed for an ongoing longitudinal impact study. All non-participants in the standard-income category were future participants on program waiting lists.



Non-participants in the low-income and common-area lighting categories were drawn by random sampling from the county tax assessor's database, and verified for matching attributes. The low-income control buildings were sampled from neighborhoods with high-proportions of low-income residents. Brief telephone calls to building owners were made to verify the proportion of low-income tenants, in the building-owner's opinion. The common-area lighting control buildings were sampled from condominiums with attributes similar to program participants; telephone calls also were made to locate suitable contact persons. A consultant (BRACO Consulting Services, Inc.) was engaged to develop the low-income and common-area lighting control groups, and to verify the key contact information.

Seattle City Light located telephone numbers for participants from program records, as well as for standard-income non-participants on the program waiting list. Other non-participant addresses and telephone numbers were located via the county tax assessor's database and a current telephone book. The control-group development consultant and a City Light work/study project aide made pre-survey calls in October-November 1995 to all building owners, residential managers, or property managers, to verify and correct the current contact name, mailing address, and telephone number(s). In cases where building-related personnel changed over the time period 1985-1993, more than one contact person was identified to gather a contiguous history of building changes during the complete time span.

Calling for Survey 3 took place between December 13, 1995 and January 25, 1996, using experienced Hagler-Bailly Consulting, Inc., interviewers. The telephone survey data were collected using CASES, a computer-assisted telephone interviewing (CATI) software package developed and supported by the University of California-Berkeley. In most cases, seven attempts minimum were made to reach each sampled building contact.

### **2.2.2 DATA ANALYSIS METHODS**

**Waves 1 & 2:** Seattle City Light pre-tested the Customer Satisfaction Survey instrument in July 1994 using role-plays and debriefings with staff of the two programs. The instrument was also pre-tested with four program participants completing projects in 1993 (two standard-income and two common-area lighting), who did not have buildings scheduled for treatment in 1994. The survey questions were reviewed after these six interviews to ensure the suitability of pre-designed responses, in the light of replies to open-ended items.

After fielding of Wave 1 interviews, the close-ended responses were numerically coded and entered into a spreadsheet. Open-ended responses were added as textual notes attached to close-ended codes. These data were later coded for content analysis. The data were forwarded to the consultant, HBRS, Inc., for analysis and reporting.

The consultant fielded the survey with the Wave 2 sample, for which they performed data entry and analysis using SPSS statistical software. They generated the “top-line” frequency and cross-table reports which appear in Appendix B (bound separately). The consultant prepared two brief technical reports with graphic displays of key findings, along with overhead transparencies for report review presentations to program staff.

The Seattle City Light evaluator integrated the two databases using SPSS and conducted t-tests of differences in responses between the Wave 1 and Wave 2 participants. The present report incorporates and extends the analysis prepared by the fielding service.

**Survey 3:** The consultant fielding the Survey 3 interviews also performed data entry and analysis using SPSS statistical software. Coding of open-ended responses was performed by a City Light work/study project aide. The Seattle City Light evaluator prepared the analyses presented in this report. Survey 3 collected information about changes in buildings, occupancy, appliances, and measures (apart from program measures) which might affect energy usage over the time period extending from 1987 through 1994.

**Implications & Updates:** Draft study findings were presented and discussed with Seattle City Light program staff as a group on various occasions in 1995 and again recently in 1998. The evaluator also reviewed findings with the field manager, conducting several interviews to update program developments relating to each survey finding. As a result, each set of survey findings in this report is followed by an “Implications” discussion and a current “Update” subsection, reflecting the evaluator’s analysis and interpretations.

### 2.2.3 SURVEY RESPONSE RATES

**Wave 1:** Interviews were completed with 27 program participants, or 77% of participants and averaged 10.9 minutes per completion, with a range of 5 to 25 minutes. All 8 of the whole-building participants responded to the request for an interview, while 19 of 36 common-area lighting participants responded (70%).

**Wave 2:** Interviews were completed with 51 program participants, or 74% of participants (Table A.1) and averaged 17.5 minutes per completion, with a range of 9 to 35 minutes. Among those not completing the survey, 1 had just begun participating, 9 had been called ten times, and a correct phone number could not be located for 6. Management for 2 buildings had changed, preventing the completion of interviews for those buildings. Out of 31 contacted, 23 whole-building participants responded to the request for an interview (74%), while 28 of 45 common-area lighting participants responded (also 74%).

**Table 2-A: Multifamily Customer Satisfaction Surveys: Response Rates**

	Whole-Building Participants		Lighting-Only Participants	
	Number	Percent	Number	Percent
Quarter 1 - Quarter 2, 1994 Participants	8		36 (51*)	
<b>Sampled for Wave 1 Survey</b>	<b>8</b>		<b>27</b>	
Called repeatedly	0	0%	8	30%
<b>Wave 1 Completes</b>	<b>8</b>	<b>100%</b>	<b>19</b>	<b>70%</b>
Quarter 3 - Quarter 4, 1994 Participants	31		45 (55 *)	
<b>Sampled for Wave 2 Survey</b>	<b>31</b>		<b>38</b>	
No valid listing	4	13%	2	5%
No longer manage property	1	3%	1	3%
Have not started installation	0	0%	1	3%
Called 10 times or more	3	10%	6	16%
<b>Wave 2 Completes</b>	<b>23</b>	<b>74%</b>	<b>28</b>	<b>74%</b>

Notes: \* Number of buildings in participating common-area lighting projects.

**Survey 3:** The consultant fielding service completed 332 telephone interviews with the building owners and property managers of 330 buildings. Of these, 270 were program participants and 60 were non-participants. The majority of participants interviewed took part in the standard-income whole-building program.

Among those not completing the survey, 21 refused the interview, 79 could not be reached after multiple attempts, and a correct phone number could not be located for 5. Similar numbers of contacts refused the interview in the participant and non-participant groups; however, these numbers were proportionately smaller among former program participants.

Overall, 76% of the contacts in the sampling frame completed interviews. The single group with a noticeably lower response rate was the control sample drawn to represent non-participants in the Multifamily Common-Area Lighting Program. As many of these buildings are condominiums, it was more difficult to locate suitable and knowledgeable contact persons. Overall, the telephone interviews averaged 10 minutes per completion.

**Table 2-B: Multifamily Measures Survey: Response Rates**

	Standard-Income Whole-Building		Low-Income Whole-Building		Common Area Lighting Only		Over- All
	Participants	Non- Participants	Participants	Non- Participants	Participants	Non- Participants	Total
<b>Starting Sample</b>	<b>239</b>	<b>32</b>	<b>65</b>	<b>28</b>	<b>39</b>	<b>32</b>	<b>435</b>
No Valid Listing	1	0	0	2	0	2	5
Refusal	6	5	4	3	1	2	21
Unable to Contact After Multiple Attempts	40	3	10	2	11	13	79
<b>Completes</b>	<b>192</b>	<b>24</b>	<b>51</b>	<b>21</b>	<b>27</b>	<b>15</b>	<b>330</b>
<b>Response Rate</b>	80%	75%	78%	75%	69%	47%	76%

The sample frame for each participant group was drawn from all buildings completing installation and inspection of program measures by the end of each study year, as documented in the ENERGY CONSERVATION ACCOMPLISHMENTS REPORT: 1977-1995 (the Common-Area Lighting Program frame was adjusted to include a few projects with installation completed in 1993 but inspections delayed until early 1994). The combined participant sample frames contained 483 buildings, of which 71% were drawn for the impact evaluation sponsoring the Measures Survey. Interviews were completed with 270 buildings, representing 79% of the sample frames and 56% of the original participant groups.

Sampling bias in Survey 3 derives from two major sources: the 61 buildings for which an owner or property manager could not be reached for an interview (13% of the original population of program completions); and the 140 buildings not drawn into the sampling frames for a variety of reasons that made them unsuitable for the impact evaluation or impossible to contact for this survey (29% of the original population). Some reasons for excluding buildings were: electric master-meters, commingling house and tenant energy consumption; atypical construction types (e.g., concrete high-rise); multiples of buildings per project site (handled by sub-sampling); and change of ownership or management, due to death or property sale, where no knowledgeable party could be located.

Chapter 3 of this report is organized in sections by topic, providing tables and figures to report the survey findings. The data in each section are followed by a discussion of the implications, and an update on subsequent program actions and circumstances. Chapter 4 summarizes these discussions and states several recommendations for program modification.

### 3. Survey Results

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#### 3.1 Measures Installed

**Wave 1:** Table 3-A shows the measures that were installed by the participants from each group. A majority of the whole-building Standard-Income Program participants installed windows, showerheads, and common-area lighting. Only a third of the whole-building participants installed insulation. Lighting fixtures and lamps were the only measure for which Common-Area Lighting Program participants were eligible.

**Table 3-A: Wave 1 Measures Installed**

	Whole-Building Participants (n = 8)	Common-Area Participants (n = 19)
Windows	88% (7)	NA
Common-Area Lighting	75% (6)	100% (19)
Showerheads	63% (5)	NA
Insulation	38% (3)	NA

Percentages total to more than 100% because participants could install more than one measure.  
NA Not applicable

**Wave 2:** Table 3-B shows the measures that were installed by participants from each group. Almost all of the Standard-Income Program participants installed windows and common-area lighting. Very few whole-building participants installed insulation and a third installed showerheads. Lighting fixtures and lamps were the only measure for which Common-Area Lighting Program participants were eligible.

Figure I illustrates the size of the Wave 1 and Wave 2 samples from projects completing whole-building and common-area lighting measures during 1994. Very few buildings were available for the whole-building sample in Wave 1. This reflects the fact that program operators concentrate on conducting audits in the early part of the year, preparatory to installing measures before the next heating season

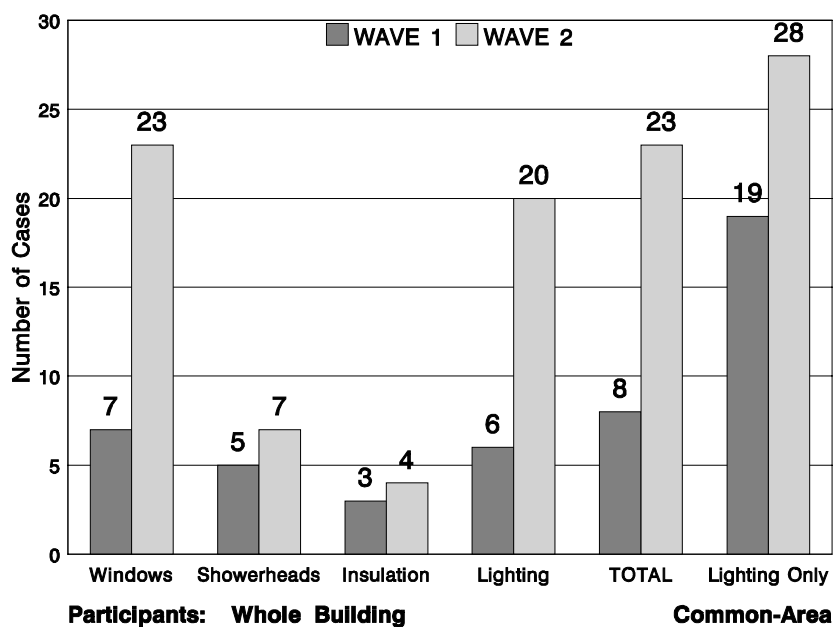
begins. Completing the inspection phase for weatherization jobs typically extends into the winter months. In 1994 there were few newly-completed projects from which to sample for the whole-building program. By contrast, projects entailing only common-area lighting are started and completed year-round.

**Table 3-B: Wave 2 Measures Installed**

	Whole-Building Participants (n = 23)	Common-Area Participants (n = 28)
Windows	100% (23)	NA
Common-Area Lighting	87% (20)	100% (28)
Showerheads	30% (7)	NA
Insulation	17% (4)	NA

Percentages total to more than 100% because participants could install more than one measure.  
NA Not applicable

**Figure I: Program Measures Installed by Survey Participants**  
(number of cases receiving each measure)



**Implications:** The Wave 1 sample of whole-building participants was very small; hence comparisons with the Wave 2 group on other survey questions are not likely to yield significant differences. The common-area lighting-only participants, however, were sampled in sufficient numbers to enable statistical comparisons between Wave 1 and Wave 2. Such comparisons are made in the following sections to examine the effects of changes in program processes during the 1995 program year.

Nonetheless, a drop in buildings receiving showerhead measures would have been expected from Wave 1 to Wave 2 in 1994. During 1993 and 1994, Seattle City Light made a strong push with its Home Water Savers Program in the multifamily sector. This program provided direct installation of showerheads and faucet aerators (bathroom and kitchen) in multifamily buildings containing five units or more and having electric water heat. Direct installation services were provided by the Seattle Conservation Corps, the Seattle Water Department, the Seattle Housing Authority, and individual building owners (with City inspections). By the end of 1993, the City's efficient showerheads had already reached a third (35%) of all multifamily units in Seattle; by the end of 1994, they were in half (50%). Of buildings with an electric water heat energy source, these proportions were 41% and 58%, respectively.

**Update:** In the most recent program year, participants installed the following mix of measures.

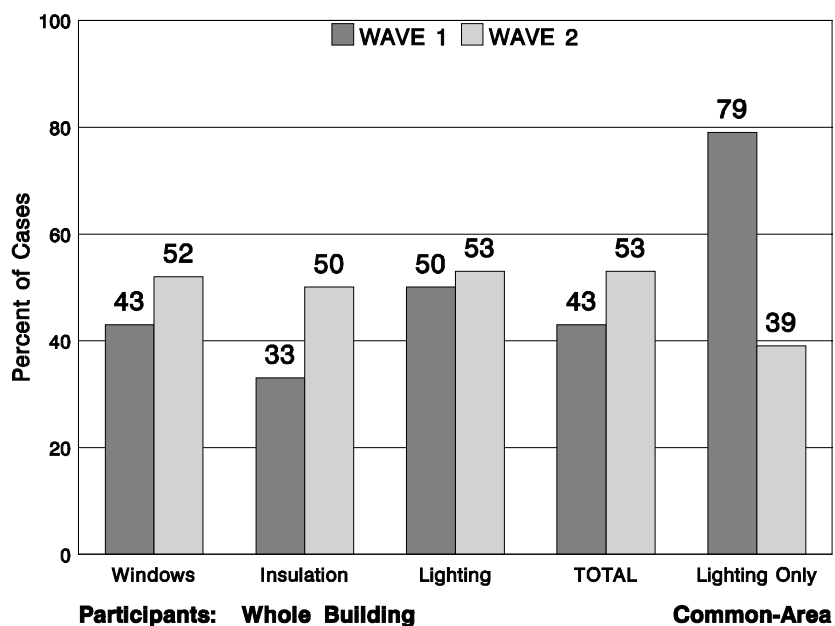
<b>1997 Program Total Contracts Authorized</b>	<b>Whole-Building Participants</b>	<b>Common-Area Participants</b>
Buildings (projects)	77	129 (129)
Units	1,337	4,289
Windows	100%	NA
Common-Area Lighting	56%	100%
Showerheads	3%	NA
Insulation	29%	NA

### **3.2 Use of Minority or Women-Owned Contractors**

**Wave 1:** Only two of the participants (one each from the whole-building and lighting-only participant groups) reported that they chose a woman or minority-owned contractor for their job (Table 3-C). A substantial number for each measure reported that they did not know if the contractor had been a woman- or minority-owned business. These results for both survey waves are depicted in Figure II. The abbreviations refer to Women's Business Enterprise (WBE) and Minority Business Enterprise (MBE).

**Table 3-C: Wave 1 Use of Women- or Minority-Owned Contractor**

	Whole-Building Participants			Common-Area Lighting Participants
	Insulation (n = 3)	Windows (n = 7)	Lighting (n = 6)	Lighting (n = 19)
Yes	0%	14%	0%	5%
No	67	43	50	16
Don't Know/Missing	33	43	50	79
Total	100%	100%	100%	100%

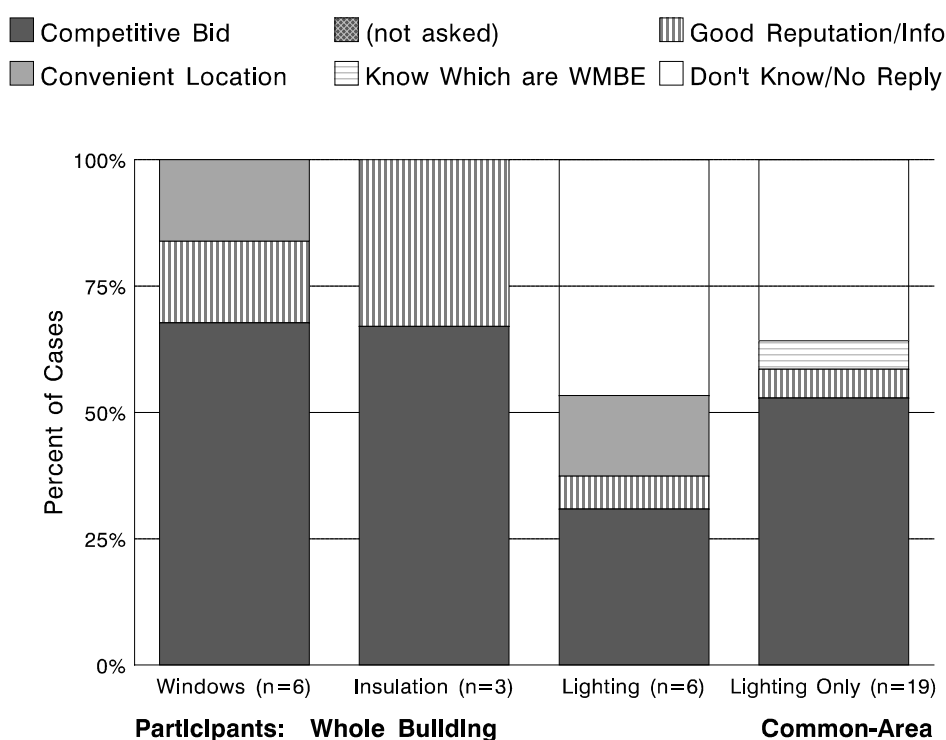
**Figure II: Customers Who Don't Know if Contractor was WBE/MBE  
(percent of cases)**

Among the two participants who hired woman/minority-owned contractors, one indicated that they had sought such a contractor, while the other indicated that this contractor had provided the lowest bid. The most commonly given reason given for not selecting a woman/minority-owned business was that the choice was made on the basis of the lowest bid. A number of participants also indicated that they did not know at the time which contractors fit this description.



Figure III shows that most participants reported it would take a competitive bid for them to select a woman/minority-owned business as the contractor for their project. The reputation of the business, information about which businesses meet this criterion, and whether the contractor was conveniently located were also mentioned as potential criteria for making this selection. A significant proportion of the whole-building participants who received common-area lighting measures and the lighting-only participants indicated they did not know (or elected not to answer the question of) what it would take for them to select a woman/minority-owned business for their lighting project.

**Figure III: What it Would Take to Consider a WBE/MBE Contractor [Wave1]**  
(percent of cases giving reason)



**Wave 2:** None of the participants reported that they chose a woman or minority-owned contractor for their job (Table 3-D). A substantial number of respondents for each measure reported that they did not know if the contractor had been a woman- or minority-owned business. The proportion who did not know declined from Wave 1 to Wave 2, however, among the lighting-only participants, as shown previously in Figure II.

**Table 3-D: Wave 2 Use of Women- or Minority-Owned Contractor**

	Whole-Building Participants			Common-Area Lighting Participants
	Insulation (n = 4)	Windows (n = 23)	Lighting (n = 20)	Lighting (n = 28)
Yes	0%	0%	0%	0%
No	50	48	47	61
Don't Know/Missing	<u>50</u>	<u>52</u>	<u>53</u>	<u>39</u>
Total	100%	100%	100%	100%

The most commonly given reason given for not selecting a woman/minority-owned business was that the choice was made on the basis of the lowest bid. A number of participants also indicated that they did not know at the time which contractors fit this description.

**Figure IV: What it Would Take to Consider a WBE/MBE Contractor [Wave 2]**  
(percent of cases giving reason)

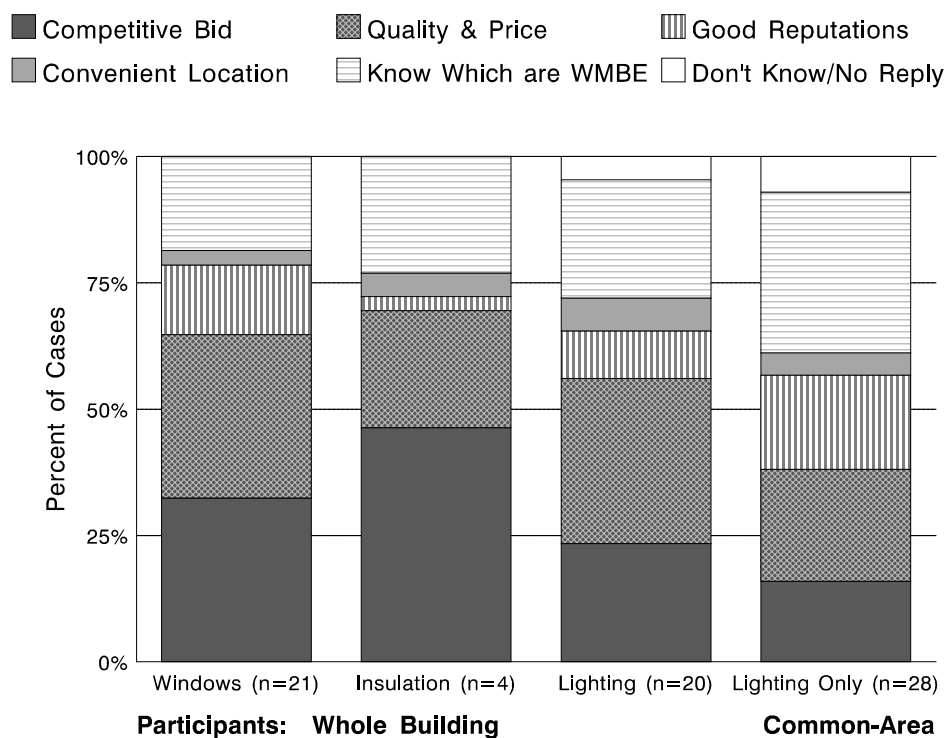


Figure IV shows that most participants reported it would take a competitive bid or quality work at a good price for them to select a woman/minority-owned business as the contractor for their project. The

reputation of the business and information about which businesses meet this criterion were also mentioned as potential criteria for making this selection. The choice of 'quality and price' was added in the Wave 2 survey. This choice appears to be a subset of the 'competitive bid' concept; the two choices combined resulted in virtually identical results from Wave 1 to Wave 2.

**Implications:** The lighting-only respondents in Wave 2 were more decisive than Wave 1 about what it would take for them to select a women/minority-owned business for their project. Where formerly half did not know "what it would take" to make such a selection, by Wave 2 all gave a criterion. What is more, the percentage who did not know whether their contractor was a WBE or MBE dropped from 79% to 39%. The changes among Wave 2 respondents seem to reflect actions taken by common-area lighting program staff to increase customer awareness about women/minority contracting.

Customers from both waves and all measures seem agreed that the paramount criteria in choosing a WBE or MBE contractor are quality, price, and a competitive bid. Following that in importance, clearly, is knowing which contractors qualify as WBE or MBE. Reputation and location are crucial to far fewer customers in the Multifamily Conservation Programs. These findings suggest that the program operators can best further the City's goals for minority and women-owned businesses by ensuring their capacity to compete on price and by publicizing their availability.

**Update:** In the most recent program year, the whole-building program mandated that bidding include at least one WBE or MBE contractor. This has been possible on the weatherization components, but there are still no women- or minority-certified contractors in the Seattle area qualified to install lighting measures. Because the programs specify new fixtures, which involves rewiring, the measures fall under State and City electrical codes that require a licensed electrician to perform the installation. This is a tighter requirement than applied to small commercial applications in 1997, for example, which often only involve change-outs of ballasts and lamps. Very recently in 1998, however, the Washington Department of Labor and Industry, Electrical Inspections Division, has determined that even changing out ballasts from one type to another requires a licensed electrician (while replacing a ballast with the same type apparently does not).

The Multifamily Programs also face a changed code environment regarding permits, as job-specific permits were not required in the past for lighting fixture replacements; turnover of management at the Department of Construction and Land Use (DCLU) in Seattle has led to a new decision on this issue. Acquiring a permit for each job will add a fee of \$35 plus \$0.90 per fixture, extra time to wait in lines to take out each permit, and more time on the job to schedule and attend inspections — in addition to more paperwork for contractors. Seattle City Light has sought a different decision from DCLU for the City programs, with negative results. Obtaining permits is a shared responsibility between the contractor and the building owner, under Seattle City Light's third party agreement. SCL staff inspect lighting jobs only for the presence of the bid fixtures, and do not perform electrical inspections, which are done by DCLU.

One factor working against the success of WBE/MBE contractors at obtaining bids is the presence in the service area of one large competitor which not only installs windows but manufactures them locally as well. By combining the roles of manufacturer and retailer, this company has created a real cost advantage (perhaps up to 15% over their competitors). As a result, this company has gained a higher volume of sales since, as Figure III and Figure IV demonstrate, price and competitive bids lead the way in customer decisions. Recent events in 1998 will change this situation. The local company, bought out by a national firm, has withdrawn from the retrofit market. Other local window-installers will be screened by the program for their qualifications to take up the slack in project volumes.

Another factor that works against WBE/MBE contractors in competing for weatherization jobs is their size and access to credit. Most contractors must purchase materials (insulation and custom windows) from manufacturers and suppliers in advance of payment from the customer and Seattle City Light. The Utility tried to work with window manufacturers to extend and expand the line of credit to WBE/MBE contractors. These contractors provide a lower volume of business, however, and the manufacturers were not willing to cut special deals for them.

A third factor, which has changed over time, reflects bidding strategies among the contractors who must purchase windows from manufacturers. At one point, SCL staff noticed that contractors submitting combined bids for insulation plus windows were “under-bidding” the insulation component. This apparently was a strategy to off-set cost disadvantages on the windows side. As more building owners chose to split the bid, selecting this contractor for the insulation but going with a different company for the windows, contractors began specifying that insulation bids were conditional upon receiving the weatherization combined job.

All these factors make it difficult for the WBE and MBE contractors to compete. The policy question for Seattle City Light has been, what is the extent of the City's role in tinkering with mechanisms of the free marketplace? Through the Multifamily Conservation Programs, Seattle City Light is a third party to agreements between customers and contractors. While the City attempted to assist contractors to compete on price, by intervening with manufacturers, this strategy fell apart. The City can, however, continue to publicize the availability of qualified WBE/MBE contractors to program participants.

Another action which may help small contractors with cash-flow issues may fall out from proposed program changes for 1998-1999. Program planners have suggested discontinuing the SCL loan program, turning the financial role over to the banking industry. Customers who have taken this route on their own report that banks can flow cash to the contractors virtually overnight, which compares very favorably against SCL's slower processes, which can take up to 30 days to finalize payment. The banking industry is best capable of processing customer loans, and it may be time for Seattle City Light to step out of this role, in the interest of both customers and contractors.

### 3.3 Overall Satisfaction with the Program

**Wave 1:** Nearly all of these participants reported a high level of overall satisfaction with the Multifamily Conservation Programs (Table 3-E). On a 7-point scale (where 7 indicates 'totally satisfied'), whole-building participants gave an average rating of 6.5 and lighting-only participants gave a 6.6 rating.

Two alternate methods were used to reveal overall satisfaction: customers were asked whether they would participate in the program again, and whether they would recommend the program to a friend or business associate. Figure V shows that almost all customers would be willing to participate in the program again, and all would recommend it to a friend or business associate. This was true for those respondents who received the whole-building weatherization measures, as well as for those who only received the common-area lighting measures.

**Table 3-E: Overall Participant Satisfaction with the Program**

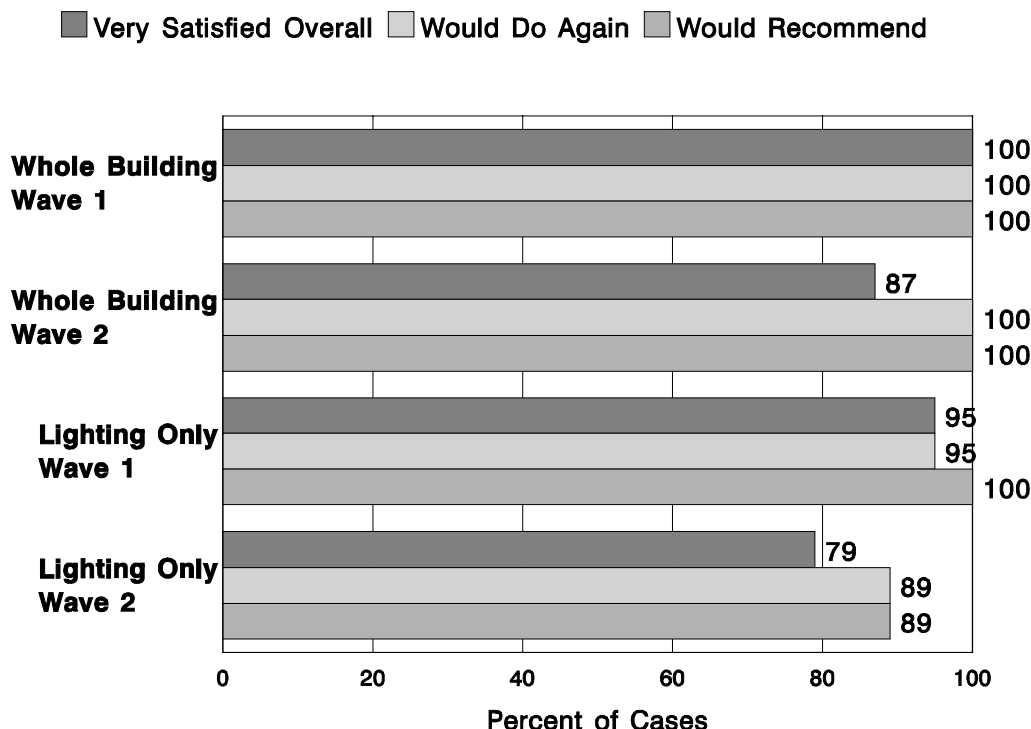
	<b>Whole-Building Participants</b>		<b>Common-Area Lighting Participants</b>	
	<b>Wave 1 (n = 8)</b>	<b>Wave 2 (n = 23)</b>	<b>Wave 1 (n = 19)</b>	<b>Wave 2 (n = 28)</b>
Overall Satisfaction with Program (0 = not at all, 7 = totally satisfied)	6.5	6.4	6.6	6.2

**Wave 2:** Nearly all of the participants reported a high level of overall satisfaction with the program (Table 3-E). Whole-building participants gave an average rating of 6.4 and lighting-only participants gave a 6.2 rating. As Figure V shows, all of the whole-building participants and nearly all of the lighting-only participants indicated they would be willing to participate in the program again and would recommend it to a friend or business associate.

**Implications:** There is no statistically significant difference between the ratings given by Wave 1 and Wave 2 respondents. City Light's participating customers are extremely satisfied with the Multifamily Programs. Participating more than once is a tacit reflection of satisfaction with the program.

Recommending the program to a friend or business associate reflects strong satisfaction and the expectation that the other person will likewise have a positive experience. People generally will not put their own reputation at risk by making such a recommendation, especially to a business associate, if a negative experience might result to reflect back upon their relationship.

**Figure V: Overall Satisfaction with the Program**  
(percent of cases giving high ratings)



Overall Satisfaction: Rated 6 or 7 on scale where 7 is "totally satisfied" and 1 is "not at all."

Participate Again and Recommend Programs to Others: Number answering "yes."

Response to the direct question about satisfaction is strongly supported by two alternate measures of satisfaction, such as the willingness to participate again and to recommend the program to a friend or business associate. In fact, of the 78 customers surveyed, 21% had already recommended the program, and 15% had already participated more than once. These numbers under-report multiple participation because customers with more than one building served in 1994 were questioned about only one of those buildings. Customers contacted in the Wave 1 survey were screened out of the Wave 2 sample, to reduce the number of repeated contacts with customers. In summary, from the viewpoint of City Light's customers, these are very successful programs.

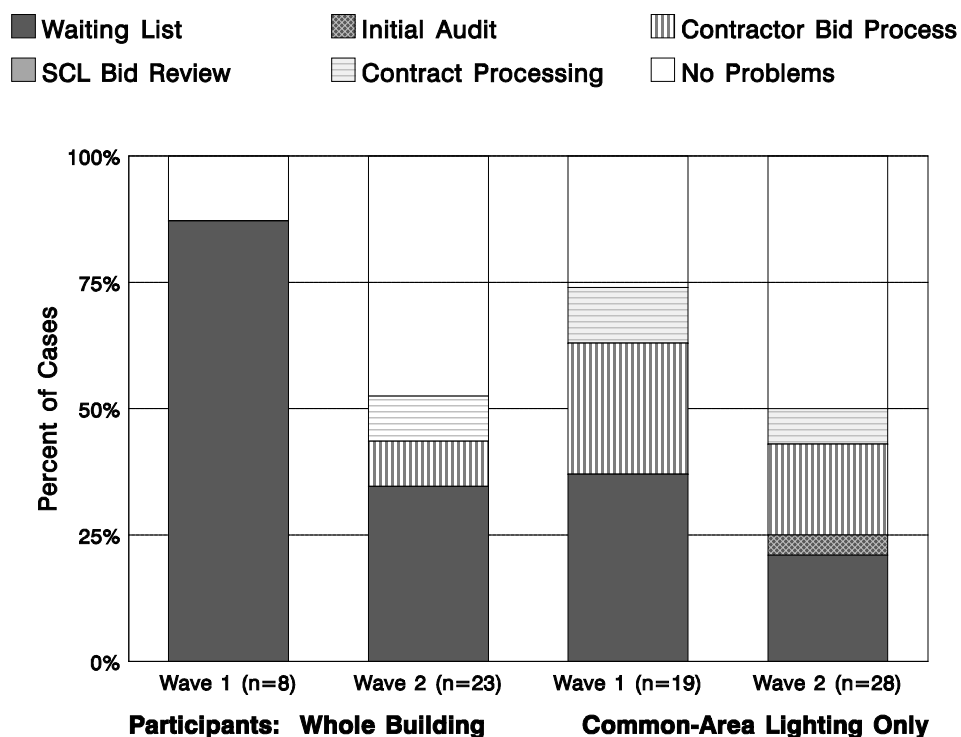
### 3.4 Satisfaction with Program Processes

#### 3.4.1 PROGRAM STEPS THAT CAUSED THE GREATEST PROBLEM

Participants were given a list of five program steps that occurred relatively early in the program—the waiting list, the initial audit, contractor bidding, SCL bid review, and contract processing. Respondents were asked to indicate which had caused them the greatest problem. In a similar question, respondents were asked to indicate which of the program steps that occurred in the installation phase caused them the greatest problem — the up-front payment and financing, the installation, job monitoring by SCL, the inspections, or the warranty work.

**Wave 1:** In response to the first set of five program steps, nearly all of the whole-building participants indicated that the waiting list caused the greatest problem (Figure VI). One whole-building respondent indicated there were no problems. The responses of the lighting-only participants reflected greater variability. A quarter saw none of the steps as a problem. A third associated their greatest problem with the waiting list, but just as many selected the contractor bidding process or SCL contract processing.

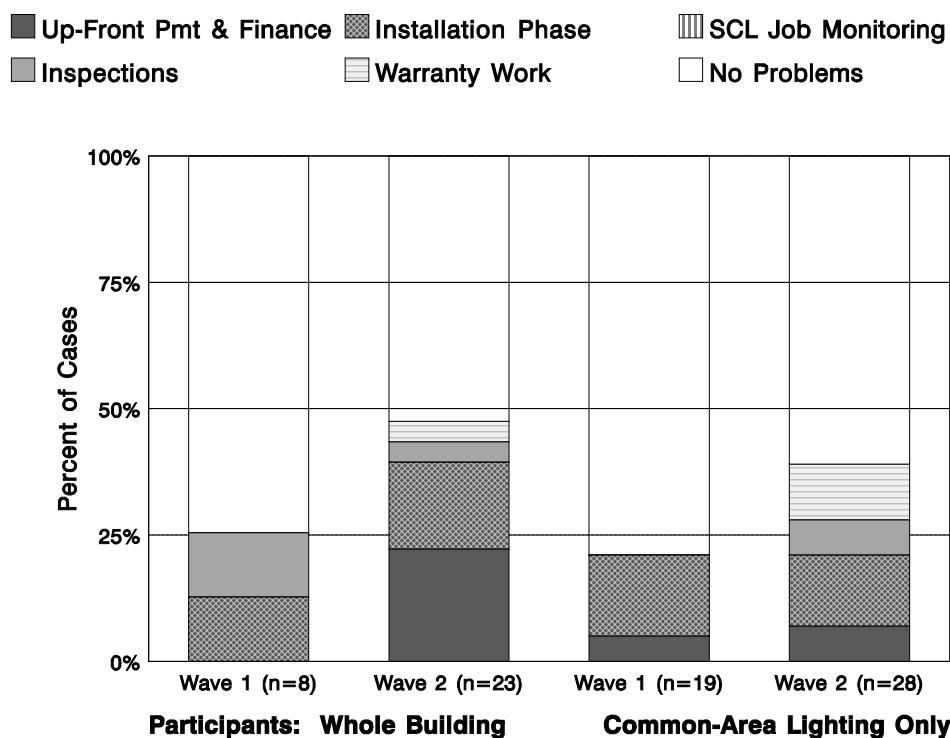
**Figure VI: Early Program Steps That Caused the Greatest Problem**  
(percent of cases citing problem type)



In response to the second set of program steps, the majority of participants in both groups indicated there were no problems (Figure VII). For the quarter of whole-building participants who reported a problem, one identified it as the installation phase while the other judged that the inspections caused the greatest problem. Fewer than a quarter of the lighting-only participants reported that any of the later program steps caused a problem. Of these, a few identified it as the installation phase while one judged that the up-front payment and financing procedures had caused the greatest problem.

**Wave 2:** In response to the first set of five program steps, half of the whole-building participants indicated that there were no problems (Figure VI), while most of the rest associated their greatest problem with the waiting list. Two selected either contractor bidding or contract processing as the steps that caused the greatest problem. The responses of the lighting-only participants reflected greater variability. Half saw none of the steps as a problem. A quarter associated their greatest problem with the waiting list, but nearly as many selected the contractor bidding process, while a few selected the initial audit or contract processing by Seattle City Light.

**Figure VII: Later Program Steps That Caused the Greatest Problem**  
(percent of cases citing problem type)





In response to the second set of program steps, just over half of participants in both groups indicated there were no problems (Figure VII). Nearly a quarter of the whole-building participants associated their greatest problem with up-front payment and financing, and another group indicated the installation phase, while a few selected inspections or warranty work.

Only a third of the lighting-only participants reported that any of the later program steps caused a problem. Of these, a few identified it as the installation phase, a few as inspections or warranty work, and one judged that the up-front payment and financing procedures had caused the greatest problem.

**Implications:** Respondents to the Wave 2 survey perceived fewer problems than Wave 1 respondents in the early phases of program participation, particularly in the wait-list stage. This perception is consistent with the actual decrease of wait-list time noted in Section 4.4.2, from 88 weeks to 62 weeks for the whole-building program. There were no significant changes from the Wave 1 survey to Wave 2 in respondent perceptions of the later program steps. Most customers feel the processes of installation, monitoring, inspection, warranty work, and financing went smoothly. The long waiting list is clearly the greatest problem, in the customer's viewpoint. This is followed in importance by the lighting bid process, and some perceived problems with Seattle City Light contract processing.

**Update:** In 1997, the most recent program year, the whole-building program continues to maintain a waiting list, with delays of about a year between program application and initial building audit. The common-area lighting-only program, on the other hand, has undergone significant changes since the early years in the way customers enter the program. During 1993-1994, nearly all common-area lighting contracts followed from projects brought to Seattle City Light by trade allies, who solicited customers for program-qualified measures. The role of SCL was indirect in the early years, and some customers experienced confusion about whether or not trade allies represented the Utility as employees. The early lighting jobs tended to be large in terms of number of units per project and per building. After the release of some "pent-up demand" for this new program, trade-ally leads with motivated owners began to drop and SCL program staff began to generate independent leads. In 1996-1997, SCL staff are usually the first out on a job, the program is advertised, and SCL markets it aggressively. Demand for the program is lower, in spite of these actions, and there is no waiting list for the common-area lighting-only program.

### 3.4.2 TIMELINESS OF PROGRAM SERVICE

The Multifamily Conservation Program for standard-income buildings has typically been over-subscribed since its inception, even though Seattle City Light does not advertise multifamily (whole-building) retrofit services or incentives. Whole-building customers usually hear about the program by word of mouth from contractors and business associates. Before receiving services from the Standard-Income Program, the customer's name is placed on a waiting list. Wait-list customers are contacted on a first-come, first-

served basis when staff are available to perform the audit that begins the program process. As explained in Section 4.4.1, the Common-Area Lighting Program has changed over time in handling incoming projects.

**Wave 1:** Among customers whose projects were completed in the first half of 1994, the average wait time for the whole-building program was 88 weeks (1.7 years). The wait time was reported as only about 2 weeks for the common-area lighting-only program, but most survey respondents did not state how long they were on the lighting wait list. The majority of customers reported they were satisfied with both the amount of waiting time before being served, and with the amount of time it took to go through the whole program process, as shown in Table 3-F. However, all of the whole-building participants and about half of the lighting-only participants indicated they were only somewhat satisfied with the amount of time they had to wait before being served.

In contrast, half of the whole-building participants and three-fourths of the lighting-only participants indicated they were completely satisfied with the amount of time it took to complete the program process. On a scale where -1.0 is completely dissatisfied and +1.0 is completely satisfied, the average satisfaction level of both whole-building and lighting-only customers was 0.6. This may be summarized as a group average rating of somewhat satisfied. Only one customer (a whole-building participant) indicated dissatisfaction with the time required to complete the program process.

**Table 3-F: Tolerance of Waiting Times for Service**

	Whole-Building Participants		Common-Area Lighting Participants	
	Wave 1 (n = 8)	Wave 2 (n = 23)	Wave 1 (n = 19)	Wave 2 (n = 28)
Was the Wait Time Acceptable to You?				
<i>Not at all</i>	0	4	0	2
<i>Somewhat</i>	7	12	8	10
<i>Completely</i>	0	7	10	16
Overall Time to Go Through the Program				
<i>Completely Dissatisfied</i>	1	0	0	1
<i>Somewhat Dissatisfied</i>	0	2	0	2
<i>Somewhat Satisfied</i>	3	12	4	12
<i>Completely Satisfied</i>	4	9	15	13

**Wave 2:** Among customers whose projects were completed in the second half of 1994, the average wait time for the whole-building program was 62 weeks (1.2 years). The wait time was about 32 weeks for the common-area lighting-only program, with most participants responding to this question. Most participants reported they were satisfied with both the amount of waiting time before being served and the amount of

time it took to go through the program process, as shown in Table 3-F. However, about half of the whole-building participants and about a third of the lighting-only participants indicated they were only somewhat satisfied with the amount of time they had to wait before being served.

By comparison, little over a third of the whole-building participants and almost half of the lighting-only participants indicated they were completely satisfied with the amount of time it took to complete the program process. On a scale where -1.0 is completely dissatisfied and +1.0 is completely satisfied, the average satisfaction level of whole-building customers was 0.6, while the average satisfaction level of lighting-only customers was 0.9. This may be summarized as a group average rating of completely satisfied. Only two whole building participants and three lighting-only participants indicated dissatisfaction with the time required to complete the program process.

**Implications:** Customers feel that waiting over a year for whole-building program services is excessive and not completely satisfactory, but tolerable for most. Lighting-only customers feel the same way about waiting up to eight months for program services. While customers may tolerate these long waits, they are clearly not desirable. To optimize the satisfaction of participants in the Multifamily Conservation Programs, reducing the waiting period for services is a major action that the program operators could take to improve the program.

Some question arises about interpreting the findings for the lighting-only customers. In 1994, the second year of Common-Area Lighting Program operation, already-developed projects were being brought to Seattle City Light by trade allies. According to program operators, there was only one full-time field staff person and a trainee working the Common-Area Lighting Program during most of 1994. However, project intake proceeded as quickly as possible throughout the year, and no SCL waiting list was maintained for this program. It is therefore not surprising that most survey respondents in Wave 1 did not know how long they were on a waiting list. Most respondents in Wave 2 provided an estimate of how long they were “on the waiting list before being served”. Since in actuality there was no waiting list at Seattle City Light, one questions how the respondents interpreted “waiting list” and “being served”. It is possible that delays in follow-through by contractors, or in acquiring and installing lighting fixtures, may have been incorporated into customers’ estimation of waiting for service by Seattle City Light.

**Update:** As mentioned previously, in the most recent program year (1997) the whole-building program continues to maintain a waiting list, with delays of about a year between program application and initial building audit. At the end of 1997, applications spiked upward and the most recent group to apply will likely wait 1.5 years to be served. According to program staff, customers are very eager when their time comes up on the waiting list. This often helps to alleviate delays and procrastination in getting and selecting bids. From the perspective of staff, this side-effect of maintaining a waiting list has a positive impact on managing whole-building projects, which can involve up to three contractors, numerous on-site

visits, and ongoing telephone coordination. Due to a decline in the niche market demand, there is no waiting list for the common-area lighting-only program.

### 3.4.3 CONTRACTING AND PROGRAM PROCESSES

For the whole-building participants, qualified contractors were invited to submit bids at a group bidding process. This procedure is not followed in the Common-Area Lighting Program.

**Wave 1:** As Figure VIII shows, most (6 of the 8) whole-building participants felt that the group bidding process was convenient and helpful. The remaining 2 respondents either chose the neutral category (neither convenient/helpful nor inconvenient/unnecessary) or the "don't know" response to questions about the bidding process.

Table 3-G provides the average ratings for contracting and program processes, on a scale where +1 is the most favorable choice. All of the aspects measured were rated between 0.9 and 1.0, indicating a high degree of satisfaction with each.

**Table 3-G: Average Ratings of Contracting and Program Processes**

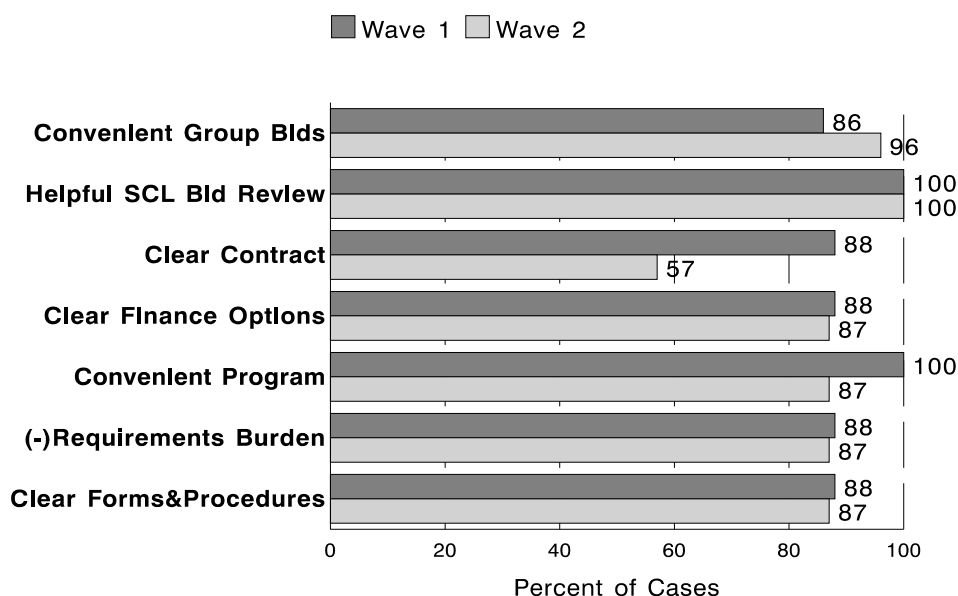
	<b>Whole-Building Participants</b>		<b>Common-Area Lighting Participants</b>	
	<b>Wave 1 (n = 8)</b>	<b>Wave 2 (n = 23)</b>	<b>Wave 1 (n = 19)</b>	<b>Wave 2 (n = 28)</b>
Group Bidding Process (-1= <i>inconvenient</i> , +1 = <i>convenient</i> )	0.9	1.0	n.a.	n.a.
SCL Bid Review (-1= <i>unnecessary</i> , +1 = <i>helpful</i> )	1.0	1.0	n.a.	n.a.
Clarity of Contract (-1= <i>not at all clear</i> , +1 = <i>very clear</i> )	1.0	0.8	0.9	0.9
Financing Options (-1= <i>not at all clear</i> , +1 = <i>very clear</i> )	1.0	1.0	1.0	0.9
Program Participation (-1= <i>not at all</i> , +1 = <i>very convenient</i> )	1.0	0.9	1.0	0.9
Program Requirements (reversed) (-1= <i>very cumbersome</i> , +1 = <i>not at all</i> )	0.9	0.9	1.0	1.0
Forms and Procedures (-1= <i>not at all clear</i> , +1 = <i>very clear</i> )	0.9	0.9	1.0	0.8

Regardless of their experience with the bidding process, nearly all of the participants in both groups reported they had received their contract from SCL within two to three weeks of selecting the successful bidder. Half of the whole-building participants and three-quarters of the lighting-only participants got their Seattle City Light contract within one to seven days after they had decided on the contractors.

Nearly all participants in both groups (7 of 8 whole-building and 17 of 19 lighting-only participants) reported that, overall, SCL's contract with participants was clear and easy to understand. The results for the lighting-only respondents are depicted in Figure IX. Virtually all of the participants in both groups reported that the financing options were clearly explained. However, only one-half (57%) of the whole-building participants reported that they know the expiration date of the one-year period during which they are eligible for the 50% discount for full payment. Of the 3 who did not know or were unsure, 1 asked a program staff person to contact them by letter.

All of the participants indicated that SCL made it very convenient for them to participate in the program. All of the lighting-only and all but one whole-building participant indicated that the program requirements were not at all cumbersome or time-consuming, and that the forms and procedures were clear.

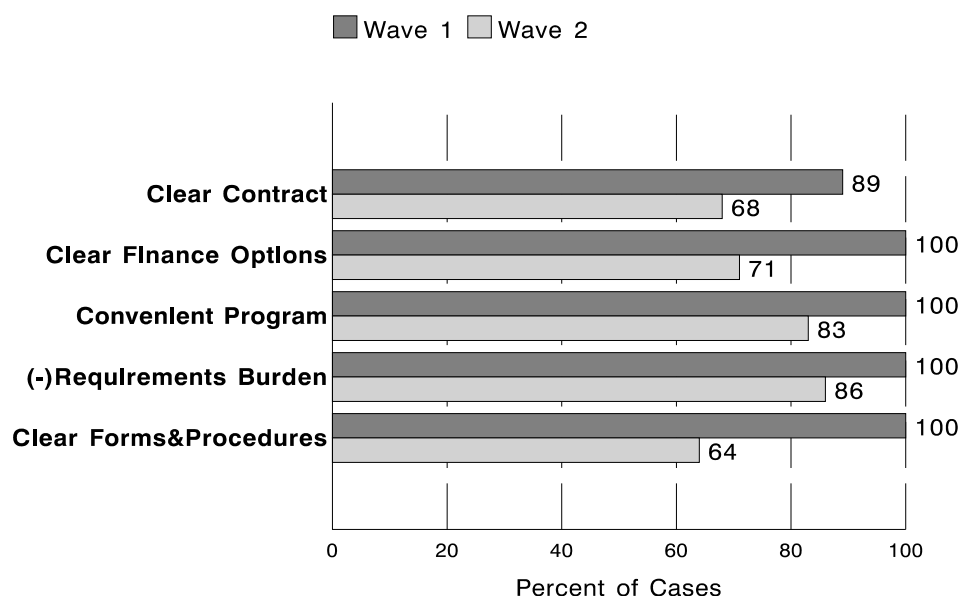
**Figure VIII: Ratings of Contracting & Program Processes,  
Whole-Building Participants  
(percent of cases giving highest ratings)**



Rated 1 on 3-point scale where 1 is "convenient bids", "helpful review", "very clear contract", "very clear finance options", "very convenient to participate", "not at all cumbersome or time consuming requirements", "very clear forms and procedures".

**Wave 2:** As Figure VIII shows, all but one of the whole-building participants felt that the group bidding process was convenient and all felt the group bidding process was helpful. Over half of the participants in both groups reported they had received their contract from SCL within two to three week of selecting the successful bidder.

**Figure IX: Ratings of Contracting & Program Processes,  
Common-Area Lighting-Only Participants  
(percent of cases giving highest ratings)**



Rated 1 on 3-point scale where 1 is "convenient bids", "helpful review", "very clear contract", "very clear finance options", "very convenient to participate", "not at all cumbersome or time consuming requirements", "very clear forms and procedures".

Table 3-G provides the average ratings for contracting and program processes, on a scale where +1 is the most favorable choice. All of the aspects measured were rated between 0.8 and 1.0, indicating a high degree of satisfaction with each.

One out of five participants in both groups reported that it took four weeks or more to receive their contract from Seattle City Light, after selecting the successful bidder. Few (2 out of 23) of the whole-building participants and only one-quarter (7 out of 27) of the lighting-only participants got their Seattle City Light contract within one to seven days after they had decided on the contractors.

Nearly all participants in both groups (22 of 23 whole-building and 24 of 28 lighting-only participants) reported that, overall, SCL's contract with participants was clear and easy to understand. However, a significantly smaller portion described the contract as “very clear” in Wave 2 than in Wave 1. The proportion calling it “somewhat clear” was 39% among the whole-building participants and 18% among the lighting-only participants.

The results for the lighting-only respondents are depicted in Figure IX. All of the respondents in both groups who were involved in project financing reported that the financing options were clearly explained. Of 22 whole-building participants, 15 (68%) reported that they knew the expiration date of the one-year period during which they are eligible for the 50% discount for full payment. Of the 7 who did not know, 2 asked a program staff person to contact them by letter and 3 asked for a telephone call on this topic.

All of the participants indicated that SCL made it convenient for them to participate in the program; most said very convenient. Nearly all of the lighting-only and all whole-building participants indicated that the program requirements were not at all cumbersome or time-consuming, and that the forms and procedures were very clear. However, fewer of the lighting-only participants described them as “very clear” in Wave 2 (64%) than in Wave 1 (87%).

When asked to elaborate in what way the program requirements were somewhat time-consuming or cumbersome, whole-building program participants gave the following reasons:

- Too many trips to the building (1)
- Time required to read contracts / paperwork / procedures (1)
- Time-consuming (1)

The lighting-only participants who thought the program requirements were somewhat time-consuming or cumbersome gave the following reasons:

- Choosing a contractor (2)
- Time required to read contracts / paperwork / procedures (1)
- Highly priced fixtures and contractors (1)

**Implications:** In 1994, the Common-Area Lighting Program eliminated the loan option available in the first program year. Payment terms went to cash only, with a discount of up to 70% of project costs that fell within cost control guidelines. Clarification of this change with trade allies, and communication via contractors to participating customers, may have had an impact on the views of Wave 2 participants about contracts, financing, and procedures. (Wave 1 participants completed jobs in the first half on 1994, but some were contracted in late 1993 under the earlier terms).

During 1994, staff have noted that there were some delays in generating contracts. Another program, called Warm Home, started up during the second quarter of the year to provide weatherization retrofits to single-family dwellings. The added load of generating 600 contracts for Warm Home Program participants in the second half of 1994 competed with producing contracts for the Multifamily Conservation Programs (see also section 3.6.1 on this topic). The Contracts Unit hired an extra, temporary staff person to help process the increased load. Staff anticipated that the Wave 2 indicators would go down, even before the second survey was fielded, but felt that the appropriate action had been taken to remedy contract delays in the future.

**Update:** In 1996-1997, the volume of new contracts being prepared by the Contracts Unit has declined by about 75%, due to termination of the citywide Warm Home Program in 1996 (service continues for a handful of neighborhood-targeted homes each year). Staff consider the work load quite manageable at present.

Regarding financing options, the main change since 1993 has been in the whole-building retrofit program. Formerly customers were offered a sliding scale discount option for “early payment”. Loans had been let with a five-year deferred payment, but if paid in full within the first year would be discounted by 50%. Payment within the second year resulted in a 40% discount, 30% in the third year, and so forth. In 1995, the sliding scale option was dropped, retaining only the 50% discount for first-year payoff. Program staffing also changed at this time, and explaining contract terms was a new task for field staff. Some early impact of those changes may have been picked up by the Wave 2 survey, when the proportion of customers dropped from 88% to 57% claiming the contract was “very clear and easy to understand”.

With the change from a sliding-scale to a one-year option on the discount, it became more important that customers be on top of the expiration date for this offer. As the survey showed for 1994 participants, 43% in Wave 1 did not know when their one-year term expired, and 32% did not know in Wave 2. In response to these findings, in 1995 program staff discussed methods to send out a letter or postcard on a routine basis, within one year of program participation, to help participants remember this key date. This is an activity that one person on the Contracts Unit staff used to do; when she left in 1992, no one else took up the activity, either in 1992 or again in 1995 when the subject was aired by discussions of the Wave 1 and Wave 2 survey results.

As of 1997, there has been no progress on developing a routine to communicate with customers about the one-year contract anniversary. This type of follow-up activity could be made easier by use of the new Conservation Tracking System, which can be customized to routinely produce the appropriate documents at a set time after program completion. In the meantime, it is important that the Multifamily Programs begin mailing out reminders and calling former customers about their one-year contract option.



### 3.5 Satisfaction with SCL Staff Interaction

**Wave 1:** Participants in both programs rated their communications with SCL staff very positively. As Figure X shows, most of the whole-building and lighting-only participants felt that SCL staff were very easy to contact, easy to communicate with, and always returned telephone calls promptly.

Table 3-H provides the average ratings for these three measures of communications, on a scale where +1 is the most favorable choice. All of the aspects measured were rated between 0.9 and 1.0, indicating a high degree of satisfaction with each.

Participants from both groups also rated highly the service they received from SCL staff (Figure XI). Nearly all participants in both programs reported that SCL staff were very courteous and helpful, very knowledgeable, and very responsive to any problems participants encountered. On a scale where the most favorable value is 1.0, all measures of satisfaction with SCL staff interactions rated 0.9 to 1.0, on average (Table 3-H).

**Table 3-H: Average Ratings of SCL Staff Communications**

	<b>Whole-Building Participants</b>		<b>Common-Area Lighting Participants</b>	
	<b>Wave 1 (n = 8)</b>	<b>Wave 2 (n = 23)</b>	<b>Wave 1 (n = 19)</b>	<b>Wave 2 (n = 28)</b>
Ease of Contact (-1= very difficult, +1 = very easy)	0.9	0.8	0.9	0.8 *
Phone Calls Returned Promptly ( 0= not at all, +1 = always)	0.9	1.0	1.0	0.9
Ease of Communication (-1= difficult, +1 = easy)	0.9	0.9	1.0	0.9
Courteous & Helpful ( 0= not really, +1 = very)	1.0	1.0	1.0	1.0
Knowledgeable ( 0= not really, +1 = very)	1.0	1.0	1.0	0.9 *
Responsive ( 0= not really, +1 = very)	0.9	0.9	1.0	0.9 *

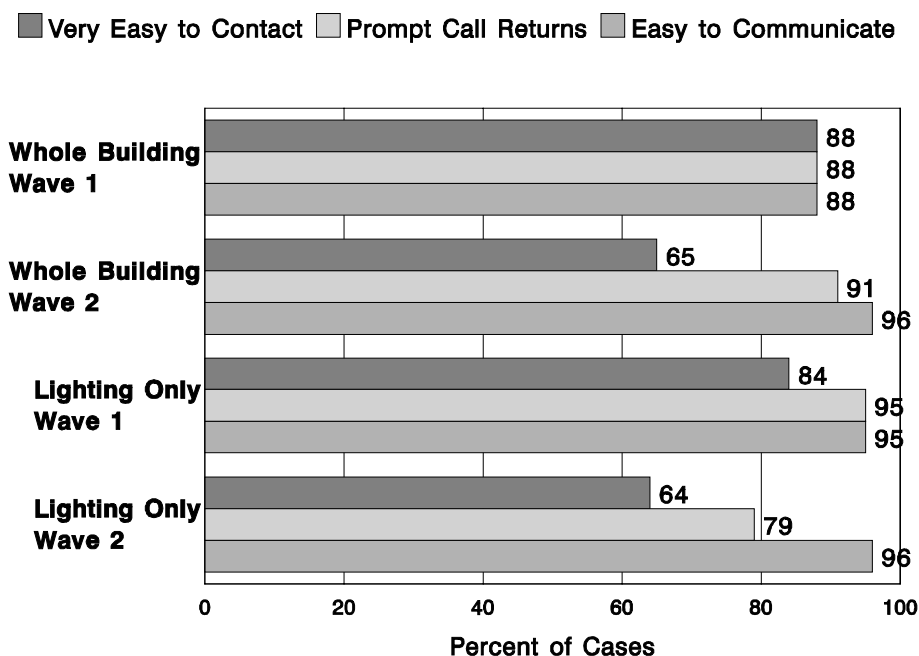
\* Significant difference from Wave 1 to Wave 2.

**Wave 2:** Figure X shows that most of the whole-building and lighting-only participants found it was easy to communicate with SCL staff, and that their telephone calls to SCL staff were always returned promptly. However, fewer participants in each program reported that SCL staff were very easy to contact. Two thirds of respondents in both programs reported that SCL staff were very easy to contact; one-third of the program participants judged it somewhat easy to contact program staff. The drop between Wave 1 and Wave 2 in average ratings for this measure (Table 3-H) was statistically significant.

Table 3-H provides the average ratings for these three measures of communications, on a scale where +1 is the most favorable choice. All of the aspects measured were rated between 0.8 and 1.0, indicating a high degree of satisfaction with each.

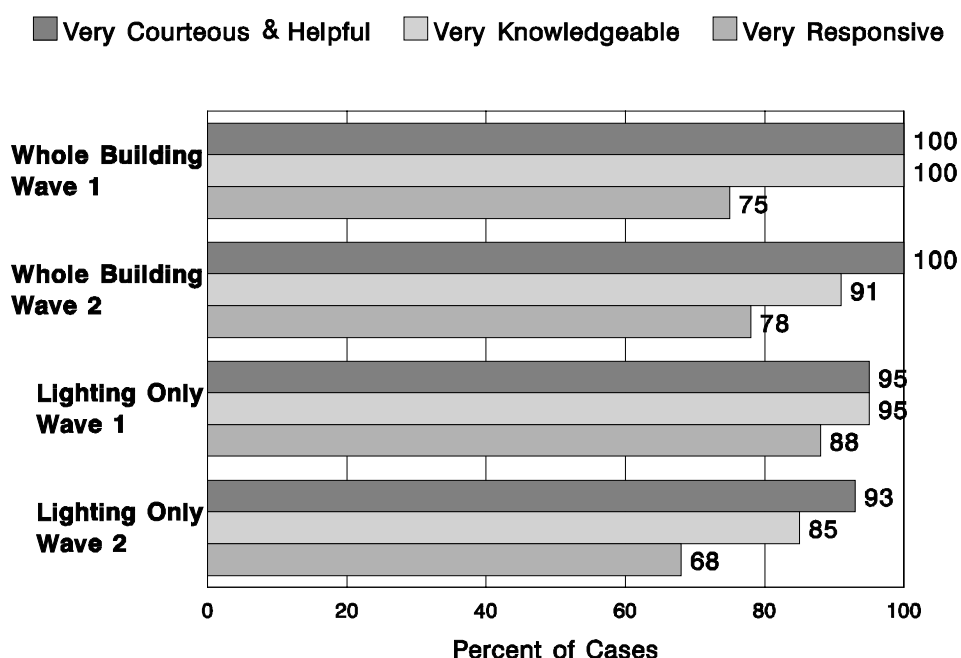
Figure XI shows that nearly all respondents rated SCL staff as very courteous and helpful, very knowledgeable, and very responsive to any problems participants encountered. All measures of satisfaction with SCL staff interactions were rated 0.8 to 1.0, on average, on a scale where 1.0 is the most favorable rating (Table 3-H).

**Figure X: Ratings of Interactions with SCL Staff [A]**  
(percent of cases giving highest ratings)



Ease of Contacting Staff: Rated 1 on 4-point scale where 1 is "very easy" and -1 is "very difficult"  
 Phone Calls Returned Promptly: Rated 1 on 3-point scale where 1 is "always" and 0 is "not at all"  
 Ease of Communication: Rated 1 on 3-point scale where 1 is "easy" and -1 is "difficult"

**Figure XI: Ratings of Interactions with SCL Staff [B]**  
(percent of cases giving highest ratings)



Courtesy & Helpfulness: Rated 1 on 3-point scale where 1 is "very" and 0 is "not really"

Knowledgeability: Rated 1 on 3-point scale where 1 is "very" and 0 is "not really"

Responsiveness: Rated 1 on 3-point scale where 1 is "very" and 0 is "not really"

**Implications:** While the graphs suggest whole-building participants rated SCL staff lower in Wave 2 on ease of contact, the Wave 1 sample was quite small and this difference is not significant statistically. However, among lighting-only participants, ratings were statistically lower in Wave 2 for three measures: ease of contacting staff (down to 0.8 from 0.9), staff knowledge (down to 0.9 from 1.0), and staff responsiveness (down to 0.9 from 1.0). This slight erosion of satisfaction with the communications and service of the common-area lighting program may be related to a slow-down in service from contractors in later 1994, and delays on the part of Seattle City Light in getting contract documents to customers.

During 1994, both Multifamily Conservation Programs were operated by field staff located in a north neighborhood service center, while administrative staff were officed in downtown Seattle. Although downtown staff acquired telephone voice mail in 1987, field staff did not have access to this communications feature until 1995, when their home office was moved downtown as well. In 1994, telephone calls from customers to field staff out of the office were received on a general conservation phone line, and staff returned calls from paper message slips. Calls always reached a live person, and urgent problems could be prioritized for intervention by back-up staff on the team. This situation appears

to be reflected in the respondent judgments that phone calls are always returned promptly, even though staff may not always be very easy to contact.

Field staff in the Multifamily Conservation Programs also have cellular telephones, which some field workers first acquired as early as 1989. These telephones are used to make calls while in the field, and not generally to receive them. The cell phone numbers are not listed on the field team business cards, but are available only to other Seattle City Light employees.

**Update:** With the 1995 move downtown, all field staff acquired electronic voice mail and the ability to pick up messages from remote locations. On the down side, customer calls are less often picked up by a live person than in the past. Senior citizens are especially reluctant to respond to voice mail, staff have observed, as well as customers who do not speak English, or do not speak it well.

Related to a possible reluctance among some customers to use voice mail is the issue of how staff communicate with customers who are not native English speakers. As a Pacific Rim city, Seattle has a significant population of immigrant citizens. Staff usually use informal methods (e.g., customer relatives) to communicate, both in person and on the phone, rather than using formal translators for the non-English speaking. Staff feel that this approach is usually effective and sufficient. Their feeling seems to be substantiated by the reports of 1994 customers. Most survey respondents in both waves reported that it was easy to communicate with program field staff. No formal analysis was made of non-response bias, however, to determine whether English-language skills influenced survey response rates (or even program participation).

Regarding the somewhat lower ratings SCL staff received throughout 1994 for responsiveness to problems encountered by customers, this may relate in part to a program policy established in 1992-1993. At that time, Seattle City Light developed an "Installer-Customer Agreement Form," a signed copy without which contracts would not be cut. Continuing to this day, at the beginning of each project, owners were and are asked to sign this statement. The form spells out that, with respect to their retrofit project, Seattle City Light is acting "as a bank" and the customer's primary relationship is with the contractor.

This form was developed to clarify for customers the City's role and liability. When problems have arisen between customer and contractor, as they do from time to time, SCL staff attempt to mediate — up to a point. When, in the staff's judgment, customers are being "unreasonable", particularly on warranties, the staff elect to back off and invoke the Installer-Customer Agreement, asking the two parties to work out the solution between themselves. As a result, customers may sometimes view Seattle City Light as taking a less active and direct role in mediating problems between program participants and contractors than customers may want.

Related to the Installer-Customer Agreement is a change in how non-financed project costs are handled. Until 1996, Seattle City Light received and held excess project costs from the customer at the time the contract was signed. These escrow moneys were paid to the contractor upon job completion, as part of the project payment in full. Contractors had to refrain from placing a lien on the building title for the non-financed amount. Beginning in 1996-1997, Seattle City Light discontinued holding this money, requiring the customer instead to pay it directly to the contractor upon job completion. Subsequently contractors had problems with some customers not paying the excess amount, or not paying it in a timely way, and were hampered by the no-lien requirement. In 1997, the Utility released contractors from their agreement, allowing them to place a lien on the title for this amount, as a means to assure customer payments.

### **3.6 Satisfaction with the Contractors**

To install program-sponsored measures, customers work with one, two, or up to three different contracting companies, depending on the categories of measures selected. Sometimes the same contractor installs both insulation and windows; often these jobs are let to separate contractors. Common-area lighting measures are done by another contractor with qualified electricians. For the few customers receiving efficient showerheads from the program, Seattle City Light made arrangements with the Seattle Conservation Corps (a City employment program) to install this measure directly.

The showerheads are a “one-size-fits-all” type of measure which can be installed immediately. Likewise, insulation as a measure is relatively low in cost; the materials can be bought “off the shelf” by the contractor, and installed without much delay. Once installed, the insulation is generally “out of sight and out of mind” for the purchasing customer.

Windows are much higher in cost and must be custom-ordered by the contractor from a manufacturer (or from the manufacturing plant, for the one Seattle-area installer that builds their own windows). Because multifamily buildings require multiple windows of similar dimensions, there are economies of scale compared to ordering windows for a single-family home. However, ordering multiples of fixed-dimension windows leads to more situations where individual windows must be fitted into openings that vary slightly from the specified dimensions, due to minor variations in building construction, settling of buildings over time, and subsequent frame distortion.

Acquiring and installing windows takes more time for contractors than does insulation. A single contractor installing both measures can schedule the work to coincide. Having separate contractors for the two measures requires more on-site time for the workers, the owner or property manager, and Seattle City Light staff (performing work-in-progress monitoring and work inspections), as well as an increased level of disruption to building tenants. For better or poorer, windows remain highly visible once installed.

Common-area lighting measures share with windows the attribute of being customized. Because the Multifamily Conservation Programs promote higher-efficiency lighting than in standard construction, contractors must order special fixtures from lighting suppliers, who to date have rarely stocked the materials but must in turn order the fixtures and lamps (bulbs) from the manufacturer or wholesaler. The lack of suitable fixtures on hand in the Seattle area has slowed progress in this aspect of the program. Recognizing that the local lighting market is not yet mature for these fixtures, the issue of delays in getting lighting materials was called out separately in questions put to the Wave 1 and Wave 2 survey respondents.

### 3.6.1 CONTRACTOR TIME AND SCHEDULING

**Wave 1:** For each of the measures installed—showerheads, insulation, windows, and common-area lighting—whole-building participants were asked to rate the performance of the contractor who conducted the installation. These items were scored on a scale that ranges from +1 for ‘completely satisfied’ or ‘excellent’ to -1 for ‘completely dissatisfied’ or ‘poor’. Table 3-I shows the average ratings given to three measures of performance.

All of the whole-building participants indicated they were completely satisfied with the installation time for showerheads (average score 1.0) and for insulation (average 1.0). A substantial majority (86%) were completely satisfied with the installation time for windows (average score 0.9). Most were also satisfied with the scheduling of the installation. These results are also depicted in Figure XII.

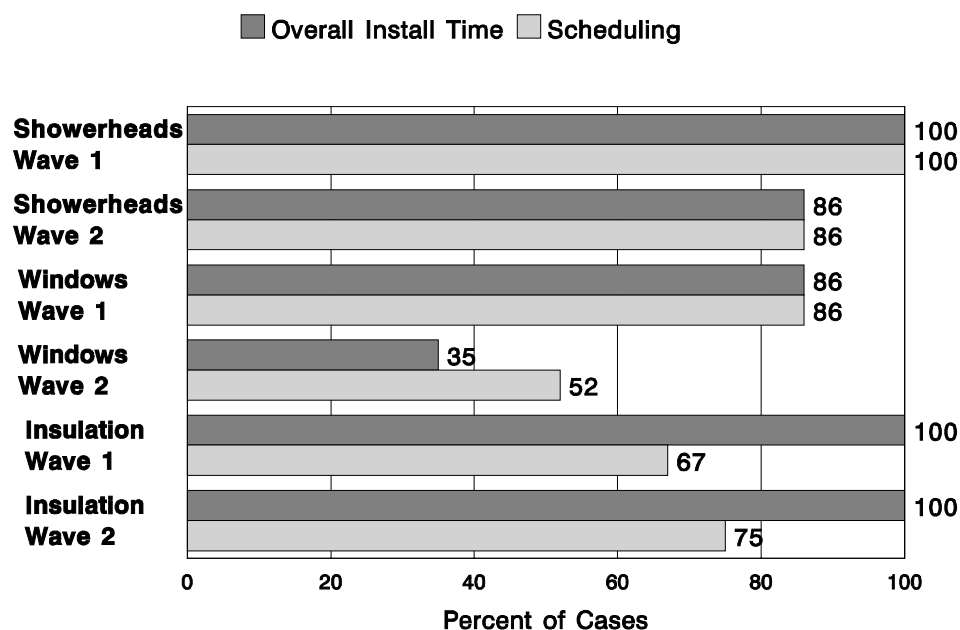
**Table 3-I: Average Ratings of Contractor Time & Scheduling**

	Whole-Building Participants				Common-Area Participants
	Showerheads	Insulation	Windows	Lighting	Lighting
<b>Wave 1</b>					
Time to Order & Get Materials				0.1	0.3
Scheduling of Installation	1.0	0.8	0.9	0.2	0.9
Overall Time to Install Measure	1.0	1.0	0.9	0.2	0.8
(-1= completely dissatisfied, +1 = completely satisfied)					
<b>Wave 2</b>					
Time to Order & Get Materials			0.4	0.5	
Scheduling of Installation	0.7	0.9	0.5 *	0.5	0.7
Overall Time to Install Measure	0.7	1.0	0.3 *	0.4	0.6
(-1= completely dissatisfied, +1 = completely satisfied)					

The whole-building participants' ratings of the contractor's performance for installing the common-area lighting was somewhat lower. Only one-third were completely satisfied with the time it took to schedule and install the lighting. The average rating of the three measures in Table 3-I was 0.1 to 0.2, which may be interpreted as ‘neither satisfied nor dissatisfied’.

Among the lighting-only participants, two-thirds or more indicated they were completely satisfied with the time it took to schedule the installation and install the measure. Few participants in either program were really satisfied with the time to order and get lighting materials, however; the average scores of 0.1 and 0.3 express an attitude just slightly better than neutral.

**Figure XII: Ratings of Contractor Performance [A],  
Whole-Building Participants  
(percent of cases completely satisfied)**



Overall Time to Install Measure: Rated 1 on 4-point scale where 1 is "completely satisfied"

Scheduling of Installation: Rated 1 on 4-point scale where 1 is "completely satisfied"

Time to Order & Get Lighting Materials: Rated 1 on 4-point scale where 1 is "completely satisfied"

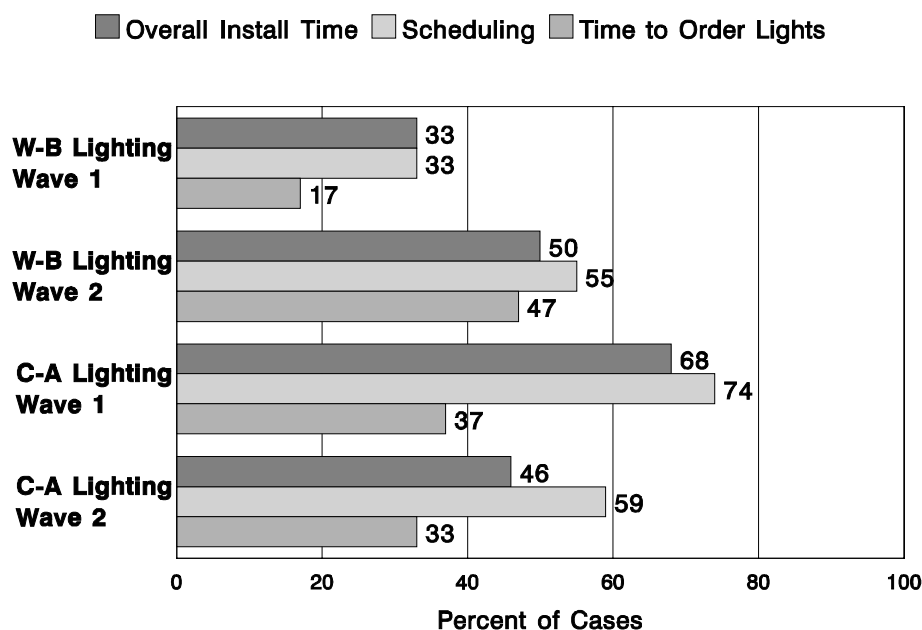
**Wave 2:** For each of the measures installed—showerheads, insulation, windows, and common-area lighting—whole-building participants were asked to rate the performance of the contractor who conducted the installation (Figure XII). A substantial majority of the whole-building participants indicated they were completely satisfied with the installation time for showerheads and insulation. Most were also satisfied with the scheduling of the contractor's work. Table 3-I shows the average ratings.

The whole-building participants' ratings of the contractor's performance for installing windows and common-area lighting was somewhat lower. Only one-third of those receiving windows and half of the lighting participants were completely satisfied with the overall time to install the measure. Only half were completely satisfied with the scheduling of installation for the window and lighting jobs. Even fewer (one-third) were satisfied with the time required to order and get lighting materials for their project.

Among the lighting-only participants, half indicated they were completely satisfied with the time it took to schedule the installation and install the measure. Even fewer (one-third) were satisfied with the time required to order and get lighting materials for their project.



**Figure XIII: Ratings of Contractor Performance [A],  
Whole-Building & Common-Area Lighting Participants  
(percent of cases completely satisfied)**



Overall Time to Install Measure: Rated 1 on 4-point scale where 1 is "completely satisfied"

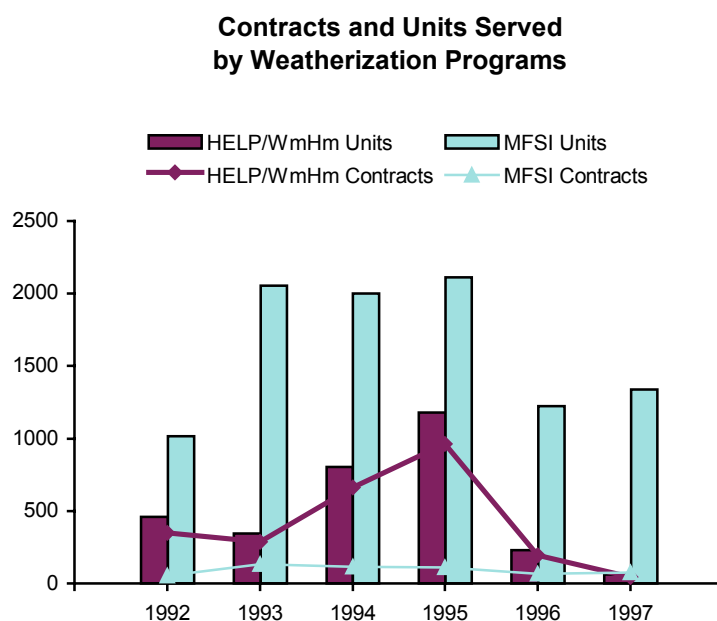
Scheduling of Installation: Rated 1 on 4-point scale where 1 is "completely satisfied"

Time to Order & Get Lighting Materials: Rated 1 on 4-point scale where 1 is "completely satisfied"

**Implications:** Regarding lighting job scheduling, the time required to order and get lighting materials, and the time to install lighting measures, the whole-building customers were far from completely satisfied with their contractors in 1994. Compared to other program measures, this is a clear deficiency that required improvement at the time of the Wave 1 survey, and which was slightly remediated by the time of the Wave 2 survey. At the same time, the lighting-only customers grew somewhat less satisfied with scheduling and installation times. This is certainly an area to which program operators should attend.

At the time of the Wave 2 survey, customers had also grown distinctly less satisfied with the scheduling of window jobs and the time to install window measures. It is worth noting that earlier in the program, contractors were required to install measures within 60 days of winning the bid and signing with the customer. In mid-1994, this interval was lengthened to 90 days for window and lighting measures. Customers whose expectations were set during the earlier period may have found the 90-day interval excessively long. Their decreased satisfaction is reflected in other measures of satisfaction with contractors, as may be seen from the following sections.

**Update:** In 1994 when these customers were participating in the Multifamily Conservation Programs, start up of the Warm Home Program for single-family weatherization retrofits significantly increased contractor workloads. Single-family and two- to four-plex participation more than doubled from 345 units in 1993 (the Home Energy Loan Program, HELP) to 802 units in 1994 (HELP ramp-down and Warm Home ramp-up). Warm Home participation in 1995 was even higher at 1,178 units. At the same time, the whole-building Multifamily Conservation Program for standard-income buildings had just doubled participation, from 1,014 units in 1992 to 2,056 units in 1993. Participation then held steady at 2,000 units in 1994 and 2,111 units in 1995. The following chart illustrates the magnitude of this rise in contract preparation workload during 1994-1995, with MFSI representing the whole-building Multifamily Program (Standard-Income).



During 1992, two loan officers (WS and KB) managed the programs; by 1995, Contracts Unit personnel had changed over and four officers were on the job (KB, GA, JG and DM); the number has declined to two loan officers in 1997 (JG and MG).

The same insulation and window contractors serve both programs. Being pulled between increased program constituencies strained their capacity, which was reflected in a slow-down of work on multifamily projects in the latter half of 1994. This problem was ameliorated in 1996 when the Warm Home Program dropped funding for window measures, and demand dropped precipitously down to 230 units; the program had nearly closed by 1997. Multifamily weatherization job starts in 1997 dropped off by half, as well.

Over the years, Seattle City Light has made efforts to smooth workloads out across seasons to reduce workload peaks for contractors and program staff in the autumn and winter months. The Utility has offered an “off-peak” bonus to reduce the cost for window bids selected during the spring and summer. This was done for insulation-only jobs in the Warm Home Program, as well, during its final Citywide year. The slower progress of lighting measures, however, impedes program projects and reduces the effectiveness of workload smoothing efforts.

The Utility has also tried to improve the range of customer choices for lighting fixtures by introducing them to the regional Lighting Design Lab, run by Seattle City Light. Staff observe, however, that customers’ decision-making also slows down lighting projects, due to the number of choices. It is a challenge for the Multifamily Programs to offer good, complete information to support customer choices while managing the flow of workloads for Utility staff and contractors.

### 3.6.2 CONTRACTOR QUALITY OF WORK

**Wave 1:** Participants scored the contractors on whether they met the customer’s standard for a job well done. On a scale ranging from +1 for ‘excellent’ to -1 for ‘poor’, the showerhead and window contractors were rated 1.0 and 0.9 respectively, equivalent to excellent quality work (see Table 3-J).

Participants receiving showerheads and windows were quite satisfied with the overall quality of the installation. Since only 3 respondents installed insulation (citing no problems with the contractors’ work), it is not possible to generalize about the average scores of 0.7 on work quality. The whole-building participants clearly scored their lighting contractors as performing lower than other contractors, averaging 0.5; this is equivalent to a rating of good.

Customers were also asked whether there was any problem with the contractor’s work during the course of the project. On this item, +1 indicates ‘no problem’ and 0 indicates that, yes, a problem occurred. A follow-on query asked whether the problem was resolved to the customer’s satisfaction. The showerhead and window contractors were rated 1.0 to 0.9, respectively, indicating few or no problems.

In the lighting-only buildings, contractors were perceived as performing at an average rating of 0.7, midway from good to excellent; the incidence of problems was rated 0.6, which suggests that 40% experienced a problem with their lighting project.

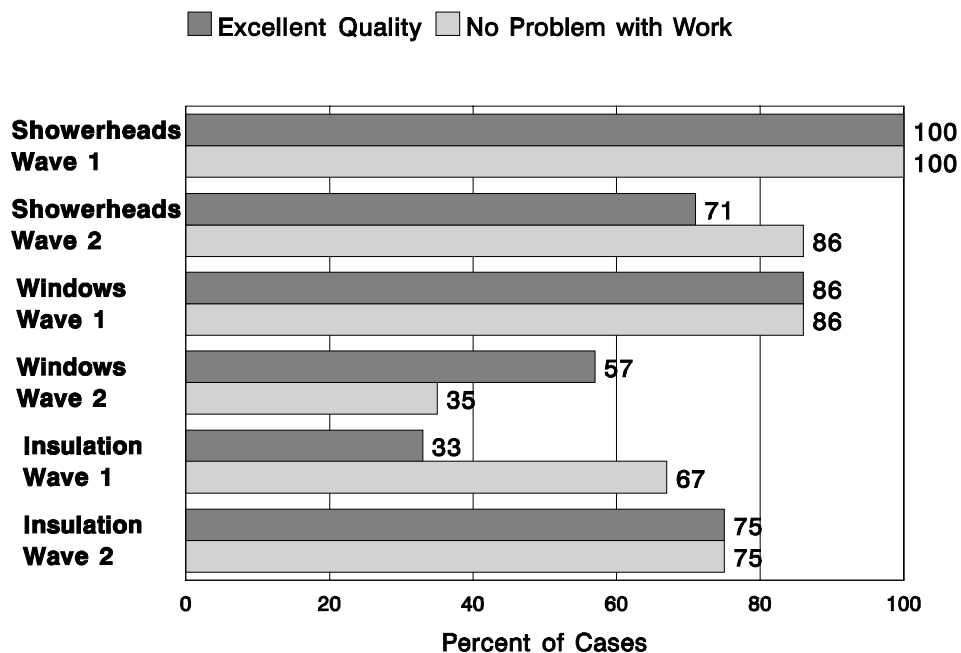
The proportions of customers giving the highest rating to each of these two measures of contractor work quality are illustrated in Figure XIV and Figure XV.

Table 3-J: Average Ratings of Contractor Performance

	Whole-Building Participants				Common-Area Participants
	Showerheads	Insulation	Windows	Lighting	Lighting
<b>Wave 1</b>					
Met Standard of Quality (0 = poor, +1 = excellent)	1.0	0.7	0.9	0.5	0.7
No Problem with Work (0 = had problem, +1 = no problems)	1.0	0.7	0.9	1.0	0.6
<b>Wave 2</b>					
Met Standard of Quality (0 = poor, +1 = excellent)	0.6	0.9	0.7 *	0.6	0.8
No Problem with Work (0 = had problem, +1 = no problems)	0.9	0.8	0.4 ?	0.6	0.6

\* Significant difference from Wave 1 to Wave 2.

**Figure XIV: Ratings of Contractor Performance [B],  
Whole-Building Participants  
(percent of cases giving highest rating)**



Met Customer's Standard of Quality: Rated 1 on 4-point scale where 1 is "excellent"  
No Problem with Contractor's Work: Rated 1 on 2-point scale where 1 is "yes"

**Wave 2:** Most customers were satisfied with the quality of the contractors' work, and reported no problems with the projects. Just over half of the whole-building customers rated the overall quality of the window and lighting jobs as excellent. As Table 3-J shows, however, average scores for the showerhead and window contractors were lower in Wave 2 than Wave 1, and the drop is significant for the window contractors. An incidence of problems rated at 0.4 suggests that about 60% experienced a problem with their window project; this is cause for some concern about the weatherization program.

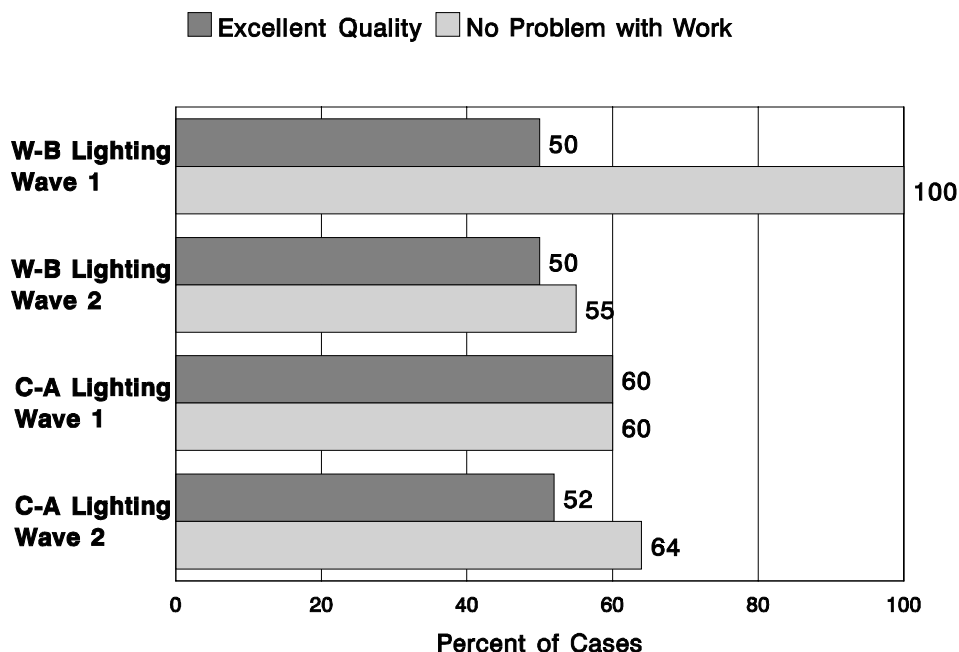
The slightly higher scores for insulation contractors is insignificant, due to the small groups in each survey wave. The whole-building participants scored their lighting contractors slightly higher in Wave 2 than in Wave 1, averaging 0.6; this is equivalent to a rating slightly beyond good. However, they reported a greater incidence of problems with the lighting projects, rated at 0.6 compared to 1.0 in Wave 1. This indicates that about 40% had some problem with their lighting project.

In the lighting-only buildings, contractors were perceived as performing at an average rating of 0.8, more than midway from good to excellent. The incidence of problems was rated 0.6, which suggests that about 40% experienced a problem with their lighting project. This proportion is the same as that found in the Wave 1 survey, indicating a potential area of weakness in the common-area lighting program.

The proportions of customers giving the highest rating to each of these two measures of contractor work quality are illustrated in Figure XIV and Figure XV.

Two of the whole-building windows participants and three common-area lighting participants indicated there was a remaining problem with the work. A majority indicated there were no problems with the lighting contractor's work, although one indicated the contractor still needed to replace some lights and fixtures. Only half of the lighting-only participants rated the overall quality of the work performed by the lighting contractor as excellent.

**Figure XV: Ratings of Contractor Performance [B],  
Whole-Building & Common-Area Lighting Participants  
(percent of cases giving highest rating)**



Met Customer's Standard of Quality: Rated 1 on 4-point scale where 1 is "excellent"  
No Problem with Contractor's Work: Rated 1 on 2-point scale where 1 is "yes"

**Implications:** Program customers were very satisfied with the work of the Seattle Conservation Corps, which installed the showerhead measures. All Wave 1 participants and three-fourths of Wave 2 participants described their work as "excellent." According to City Light program staff, the Conservation Corps was in and out of each building within days of receiving each project assignment. Kudos are due to this fine City program which provides employment opportunities to formerly-homeless citizens in need of assistance.

Regarding quality of work, the survey respondents did not uniformly receive excellence from their weatherization and lighting contractors. Customers perceived deficiencies in the lighting contractors for both programs. The quality of work by window contractors also was perceived to drop in jobs completed during the second half of 1994. Upon examination, follow-on queries about whether the problem was resolved to the customer's satisfaction showed that most were. Between the two waves, 41 problems were claimed, of which 10 remained unresolved, half of these being in lighting jobs.

Out of 6 problems cited in Wave 1, 2 remained unresolved (one regarding insulation and the other windows), although the respondent did not indicate why. Out of 35 problems cited in Wave 2, most were taken care of but 8 remained unresolved. One regarded showerheads "not installed". The other

measures affected by unresolved problems included: 2 window jobs (one with “work not completed”, the other for an unspecified reason); 3 lighting jobs for whole-building projects (one “not completed yet”, one “problem with lights”, and one “need to replace lights/fixtures”); and 2 common-area lighting jobs (one “need to replace lights/fixtures” and one unspecified reason).

Unfortunately, the customer satisfaction surveys were not designed to probe into the types of issues and problems customers may have had, just on whether resolution was reached. For insight into the causes of dissatisfaction with windows and lighting, the reader must turn to the measures survey, reported later in subsection 4.8.

**Update:** In 1997, the Seattle Conservation Corps was no longer installing showerheads for Seattle City Light’s conservation programs. With the penetration of the Home Water Savers Program into the multifamily sector, the potential pool for this measure has been nearly saturated and few new program participants are found to need efficient showerhead measures.

### 3.6.3 CONTRACTOR INFORMATION

**Wave 1:** Program participants were asked to rate the information contractors provided about the job cost and the quality of materials. The showerhead contractor, who provided a free service, was not rated on these items.

Customer evaluations of the information provided by the contractors varied by measure, as shown in Table 3-K. The whole-building participants tended to rate their contractor’s information on insulation job costs substantially higher than information received for other measures, and rated their contractor’s information on common-area lighting measures lower than information received for other measures.

The average rating for information about job cost and quality of materials was between 0.7 and 1.0 for the insulation and window contractors, where 1.0 indicates excellent. However, the lighting contractor was judged good on these measures, receiving an average rating of 0.5. The common-area lighting contractors were judged excellent on information about job cost but only good on information about the quality of materials.

**Table 3-K: Average Ratings of Contractor Information & Communications**

	Whole-Building Participants			Common-Area Participants
	Insulation	Windows	Lighting	Lighting
<b>Wave 1</b>				
Information about Job Cost	1.0	0.9	0.5	0.9
Information about Quality of Materials	0.7	0.9	0.5	0.5
(-1= poor, +1 = excellent)				
<b>Wave 2</b>				
Information about Job Cost	0.9	0.7*	0.6	0.6
Information about Quality of Materials	0.4	0.7	0.5	0.4
(-1= poor, +1 = excellent)				

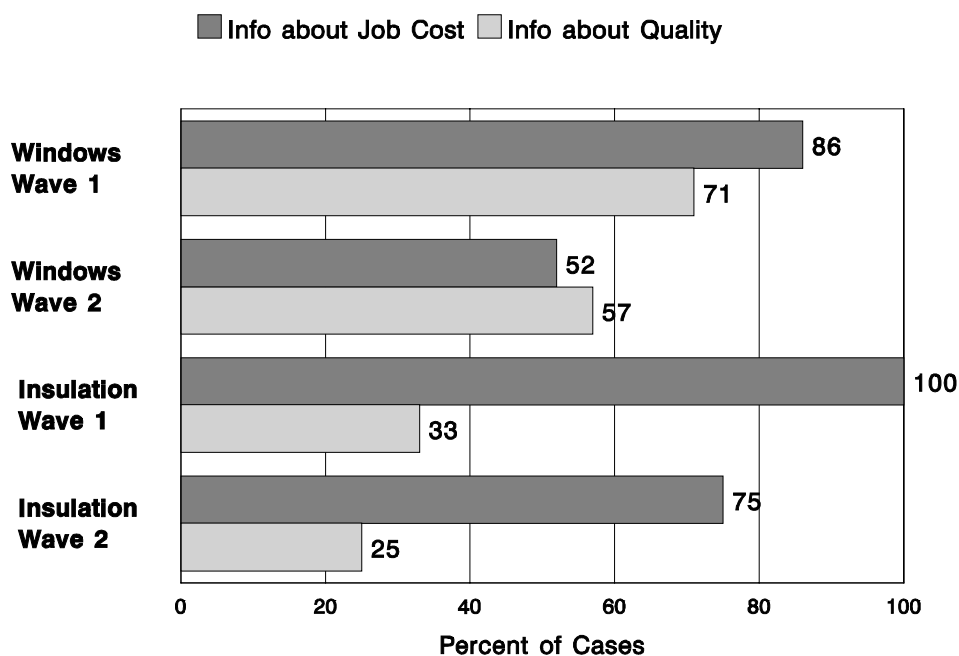
\* Significant difference from Wave 1 to Wave 2.

Figure XVI and Figure XVII illustrate the proportion of customers giving an ‘excellent’ rating to these measures of cost and quality. Among whole-building participants, most indicated that they had received excellent information about the cost of their insulation and window jobs; only half felt this way about the lighting job. Compared to information on cost, for windows and insulation a substantially smaller number gave an ‘excellent’ rating to the information they received about the quality of the measures.

Among customers receiving lighting measures, the exception is the information provided about job costs, to the lighting only customers, who rated their contractor as excellent in this area. Information on the quality of materials lagged behind.



**Figure XVI: Ratings of Contractor Information,  
Whole-Building Participants  
(percent of cases giving highest rating)**



Information about Job Cost: Rated 1 on 4-point scale where 1 is "excellent"  
 Information about Quality of Materials: Rated 1 on 4-point scale where 1 is "excellent"

**Wave 2:** As Table 3-K shows, the average rating for information about job cost and quality of materials was lower in every instance compared to Wave 1, for the insulation and window contractors. Statistically, the only significant drop was in the rating of information about job costs provided by the window contractors. However, the average rating of 0.7 for information from window contractors remains between good and excellent.

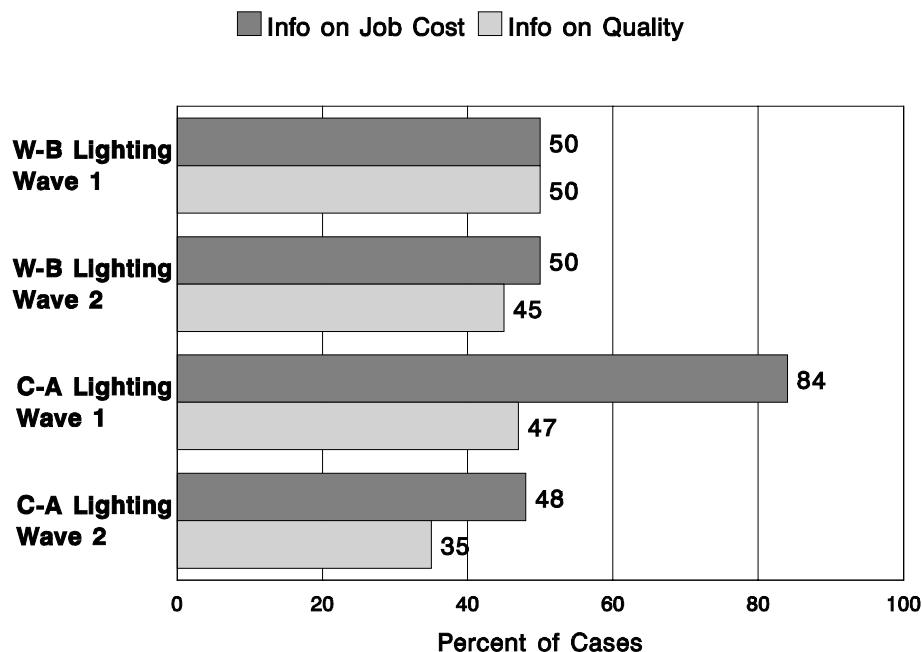
Once again, the whole-building lighting contractor was judged good on these information measures, receiving an average rating of 0.5. The common-area lighting contractors were also judged good on both information about job cost and information about the quality of materials.

Far fewer whole-building participants rated their contractor's information on insulation measures as 'excellent' in Wave 2; only one person in each survey wave felt this way about the information on the insulation quality.

Among whole-building participants, only half of the window and common area lighting participants rated their contractors as providing excellent information about job cost and quality of materials. For the most

part, common area lighting-only participants tended to rate their contractors performance the same as whole-building participants receiving lighting measures. Only 9 of 26 rated the information they received about quality of materials as excellent.

**Figure XVII: Ratings of Contractor Information,  
Whole-Building & Common-Area Lighting Participants  
(percent of cases giving highest rating)**



Information about Job Cost: Rated 1 on 4-point scale where 1 is "excellent"  
 Information about Quality of Materials: Rated 1 on 4-point scale where 1 is "excellent"

**Implications:** On the measures of information about job costs, Wave 2 respondents rated their window and insulation contractors significantly lower than did Wave 1 respondents. The Wave 2 lighting-only customers rated their lighting contractor lower on information about job costs, as well. The whole-building customers did not perceive a difference for their lighting contractors, because only half rated them excellent at providing information on job costs in Wave 1.

Regarding information on the quality of materials, few insulation customers feel they have received excellent service from the contractors. Only about half of the customers of the window and lighting contractors believe they have received excellent information about the quality of materials.

During 1994, Utility staff were being rotated through the Multifamily Conservation Program for standard-income buildings (from other Seattle City Light conservation programs). Staff rotations may have disrupted the “chain of communications” between staff, contractors, and customers to an uncertain extent.

Both Multifamily Conservation Programs need to improve service to customers in this area, whether the information is provided by contractors or program staff. The goal is to assure that all customers receive information on cost and quality that they perceive to be excellent.

**Update:** In 1997, program staffing was stable with three senior Energy Conservation Representatives delivering the Multifamily Conservation Program for standard-income buildings, and three ECRs delivering the Multifamily Common-Area Lighting Program.

Staff indicate they have expanded their description of the windows installation process for customers, covering both methods and what contractors are proposing for each job. Staff give special attention to the issue of insert windows, as in buildings having marblecrete exterior construction. Customers are given examples of nearby Program participant buildings to look at, to see how their measures may turn out, both for windows and lighting.

### **3.6.4 CONTRACTOR COMMUNICATIONS**

**Wave 1:** Participants scored contractors on three measures of how well the contractor communicated with the customer throughout the project: being accessible (easy to reach), clear (easy to understand), and pro-active (anticipating needs and problems). These items were scored on a scale that ranges from +1 for ‘very’ to 0 for ‘not at all’. Table 3-L shows the average ratings given to these three measures of communications.

**Table 3-L: Average Ratings of Contractor Information & Communications**

	Whole-Building Participants			Common-Area Participants
	Insulation	Windows	Lighting	Lighting
<b>Wave 1</b>				
Accessibility (0= not at all, +1 = very accessible)	1.0	1.0	0.8	0.9
Clarity of Communications (0= not at all, +1 = very clear)	1.0	0.9	0.8	0.9
Degree of Proactiveness (0= not at all, +1 = very proactive)	0.8	1.0	0.4	0.8
<b>Wave 2</b>				
Accessibility (0= not at all, +1 = very accessible)	1.0	0.8	0.7	0.8
Clarity of Communications (0= not at all, +1 = very clear)	1.0	0.8	0.8	0.8 *
Degree of Proactiveness (0= not at all, +1 = very proactive)	0.8	0.7	0.6	0.8

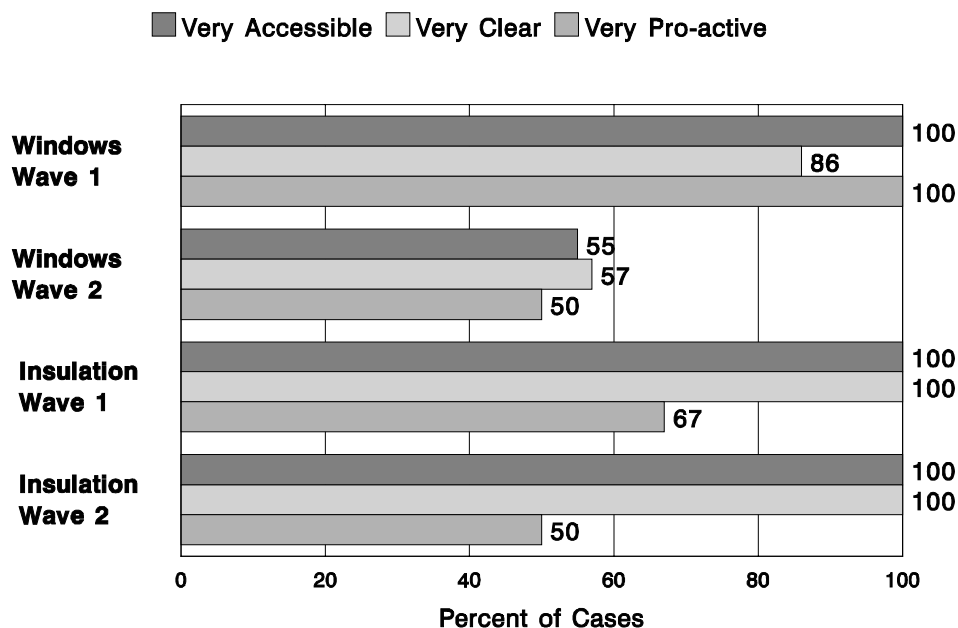
\* Significant difference from Wave 1 to Wave 2.

All ratings for the various contractors ranged from 0.8 to 1.0, indicating that on average they were very accessible, very clear, and very pro-active. The one exception is the pro-active rating by whole-building participants of their lighting contractor; this score of 0.4 indicates that they were only somewhat pro-active.

Figure XVIII and Figure XIX illustrate that most participants in both groups rated their contractors as very accessible and as providing very clear communications about most measures (with the exception again of the common-area lighting measures for the whole-building participants). However, fewer in each group tended to rate their contractor as very pro-active, with the lighting contractors standing out as less adequate. Interestingly, all customers felt their window contractor was very pro-active.

**Wave 2:** Most ratings for the various contractors ranged from 0.7 to 1.0, indicating that on average they were very accessible, very clear, and very pro-active. The one exception is the pro-active rating by whole-building participants of their lighting contractor; this score of 0.6 indicates that they were only somewhat pro-active. There was a decline from Wave 1 in the windows contractor score for pro-active communications.

**Figure XVIII: Ratings of Contractor Communications,  
Whole-Building Participants  
(percent of cases giving highest rating)**

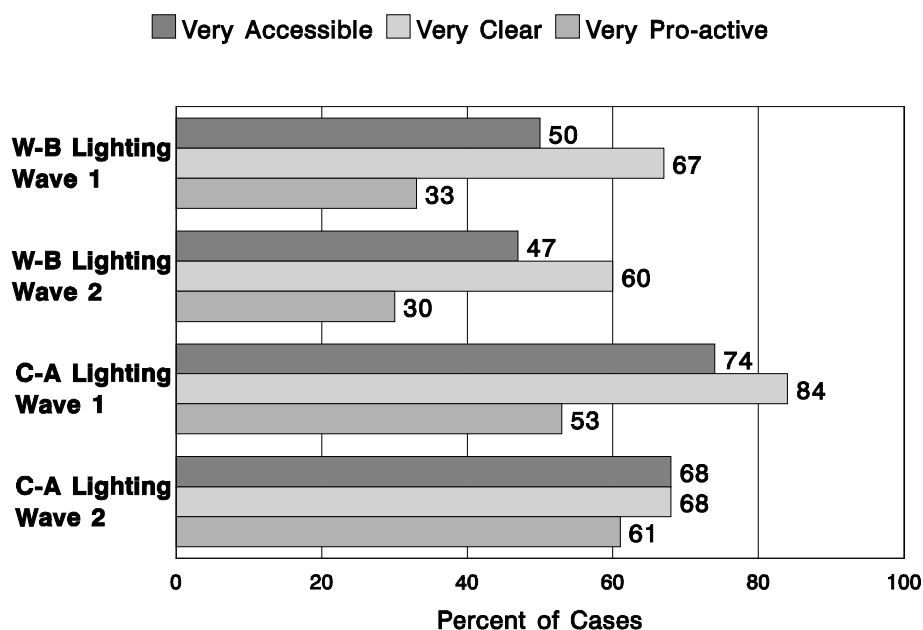


Accessibility: Rated 1 on 3-point scale where 1 is "very accessible"  
 Clarity of Communications: Rated 1 on 3-point scale where 1 is "very clear communications"  
 Degree of Proactiveness: Rated 1 on 3-point scale where 1 is "very proactive"

Among whole-building participants, just half of the window and common area lighting participants rated their contractors as being very accessible and clear with communication; this is a clear decline from the Wave 1 survey. Only a third of lighting participants rated their contractor as very proactive, as in Wave 1.

For the most part, common area lighting-only participants tended to rate their contractors performance the same or higher than the lighting contractors of whole-building participants. Two-thirds rated their contractor as very accessible and providing very clear communications; and of the 28 respondents, 17 reported their common-area lighting contractor was very proactive.

**Figure XIX: Ratings of Contractor Communications,  
Whole-Building & Common-Area Lighting Participants  
(percent of cases giving highest rating)**



Accessibility: Rated 1 on 3-point scale where 1 is "very accessible"  
 Clarity of Communications: Rated 1 on 3-point scale where 1 is "very clear communications"  
 Degree of Proactiveness: Rated 1 on 3-point scale where 1 is "very proactive"

**Implications:** On all measures of communication except information about the quality of materials, Wave 2 respondents rated their window contractors significantly lower than did Wave 1 respondents. This may reflect heavy project loads carried by window contractors during the second half of 1994. SCL staff indicate that all the window contractors (and one in particular) were 'overloaded' with projects in the second half of 1994 (in both the single-family and the multifamily programs). The ratings of survey respondents clearly reflect their imperfect satisfaction with this situation. SCL staff also suggest that contractors were "not always good" about notifying customers regarding work delays. The drop in the ratings of window contractors, from Wave 1 to Wave 2, were statistically significant on three measures: job scheduling, overall installation time, and quality of work.

In 1994 this was clearly an area of deficiency for the whole-building program which required attention. As a policy, Seattle City Light staff should strive to create an atmosphere of contact and follow-up with customers. The Utility needs to establish built-in program processes and re-contact intervals to be invoked during times of stress for contractors. These processes would place a high priority for program staff to "take up the slack" for contractors, by staying in close contact with customers and smoothing the

way. Program staff can explain the reason for delays, assure customers that their project is important, and that the Utility is keeping watch on the project. Key messages would emphasize that Utility staff are available when contractors cannot be, that the Utility is there to assist contractors on proactively keeping customers apprised of project progress, and that if communications with the contractor are not clear, Utility staff will seek out information customers need.

**Update:** According to the field manager, by 1997 staff of the Multifamily Conservation Programs have in fact become quite adept at managing the communications flow between contractors and customers. Contractor communications are a continuing problem, however. Two types of potential remedies should be considered to keep communications up-front about current contractor workloads and to prevent overloading problems.

First, data should be developed for each project on the length of intervals between key dates, such as from contract signature to passed inspections. The length of key intervals for a groups of recent projects undertaken by each contractor can be made available to staff and customers at the time new bids are being reviewed. This may enable customers to select contractors who are more on target for keeping their projects moving, and may help reduce overloads for popular contractors.

A second remedy, applied to tardy contractors, is to assess monetary fines for automatic failures (“auto-fails”), which occur when a passed inspection does not take place within 90 days of contract signature. This remedy is implemented in other Seattle City Light programs, and can be an effective incentive to contractors to keep jobs on schedule, thus preserving important profit margins.

The new computerized Conservation Tracking System is expected to help program staff stay on top of project progress, and to help the field manager identify problem patterns with contractors.

### ***3.7 Suggestions for Improving the Program***

**Wave 1:** Participants who received the common-area lighting measures were given a choice of four potential program improvements and asked to indicate which they would like SCL to implement in the Multifamily Conservation Programs. They were also given the opportunity to suggest other improvements SCL could consider.

Among the whole-building participants, there was no unanimity on the program improvements that were most preferred (Table 3-M). One respondent each favored providing sample books of products, information on comparable lighting levels, and literature on operations and maintenance. Other suggestions included shortening the wait list and having SCL staff review the contractors' bids.

Among the lighting-only participants, four preferred obtaining comparable information on lighting levels and four preferred receiving literature on operations and maintenance. None of the participants in either group preferred including lighting in tenant units.

In the last question in the survey, respondents were asked if they wished to provide any other suggestions for improving the Multifamily Conservation Programs. Three-quarters of the whole-building participants gave suggestions for improvement. Their suggestions included reducing the amount of time on the wait list, standardizing bids, removing specific contractors from the contractor list, requiring tenant participation, providing a complete list of program requirements, and using more restrictive showerheads in the program.

**Table 3-M: Wave 1 Suggested Improvements for the Lighting Portion of the Program**

	<b>Whole-Building Participants (n = 8)</b>	<b>Lighting-Only Participants (n = 19)</b>
Show Sample Books of Products	13%	0%
Provide Information on Comparable Lighting Levels	13%	21%
Provide Literature on Operations and Maintenance	13%	21%
Include Lighting in Tenant Units	0	0
Other Suggestions		
Shorten wait list	13%	0
SCL staff review bid	13%	0
Contractors get materials faster	0	5%
Same contractor who bid should do work	0	5%
No Suggestions	25%	42%

Percentages sum to more than 100 % because respondents could choose more than one response.

Half of the lighting-only participants also gave specific suggestions for improvement, three of which were related to reducing the amount of time on the wait list. Other suggested ways for SCL to improve the program included advertising more, providing more education to participants, doing home demonstrations, reviewing bids with contractors, requiring contractors to supply participants with a list of replacement bulbs, offering larger incentives, and making the women/minority-owned status of potential contractors available to participants.



**Wave 2:** Participants who received the common-area lighting measures were given a choice of four potential program improvements and asked to indicate which they would like SCL to implement in the Multifamily Conservation Programs. They were also given the opportunity to suggest other improvements SCL should consider. More than half of the participants in both groups did not suggest any improvements.

Among the whole-building participants, there was no unanimity on the program improvements that were most preferred (Table 3-N). A third of respondents requested SCL leave literature on operations and maintenance. Another four wanted SCL to provide information on comparable lighting levels, three favored showing sample books of products and two wanted to include lighting in tenant units.

Among the lighting-only participants, a third preferred showing sample books of products. another six wanted SCL to leave literature on operation and maintenance and include lighting in tenant units and four wanted SCL to provide information on comparable lighting levels.

**Table 3-N: Wave 2 Suggested Improvements for the Lighting Portion of the Program**

	Whole-Building Participants (n = 20)	Lighting-Only Participants (n = 28)
Show Sample Books of Products	15%	32%
Provide Information on Comparable Lighting Levels	20%	14%
Provide Literature on Operations and Maintenance	30%	21%
Include Lighting in Tenant Units	10%	21%
Other Suggestions	0	0
No Suggestions	55%	54%

Percentages sum to more than 100 % because respondents could choose more than one response.

In the last survey question, respondents were asked if they wished to provide any other suggestions for improving the Multifamily Conservation Programs. Half of the whole-building participants gave specific suggestions for improvements, seven of which related to reducing the amount of time on the wait list. Other suggestions included offering larger incentives, quality control and improved program documentation.

Half of the lighting-only participants also gave specific suggestions for improvement, six of which were related to reducing the amount of time on the wait list. Other suggested ways for SCL to improve the program include advertising more, quality control, standardizing bids, improved program documentation, and allowing building owners to purchase and install fixtures on their own.

**Implications:** Sufficient need exists among customers for the Utility to consider several possible improvements to lighting services in the Multifamily Conservation Programs as operated in 1994. Staff have an educational role in informing customers about comparable lighting levels, lighting operations, and lighting maintenance. The value of their performance in this role was demonstrated in an earlier impact evaluation of the whole-building Standard-Income Program. That evaluation found significant house-meter energy savings flowing from buildings where no lighting was installed (constituting 26% of all common-area savings). This was interpreted to result from auditor recommendations regarding the operation of existing lighting control systems (e.g., re-setting timers for summer versus winter hours).

Program staff should ensure that contractors routinely offer customers the opportunity to view sample books of efficient lighting products that qualify for program incentives, and help them understand the product 'cut' sheets. Multifamily building personnel (whether owner, property manager, or resident manager) who are responsible for purchasing and installing replacement lights should receive literature on operations and maintenance, as well as sources of re-stock lamps. The programs should consider rebating a limited supply of replacement lamps with each project. Alternatively, each completed project should be enrolled in a follow-up program which contacts building management at set intervals to prompt proper maintenance and provide updated resupply information.

**Update:** In 1996 the Multifamily Conservation Programs began distributing a lighting operations and maintenance fact sheet to participating customers. A formal follow-up program has not yet been established, although the new Conservation Tracking System will be capable of facilitating such a service.

### **3.8 Changes in Program Buildings and Measures**

The 1994-1995 Customer Satisfaction Surveys, Wave 1 and Wave 2, provide a snap-shot of satisfaction with program measures and processes within the first year of program participation (1994 job completions, standard-income weatherization and common-area lighting). The 1995-1996 Measures Survey provides a longer view on program measures, taken from two years to a decade later (1986-1993 job completions, low-income plus standard-income weatherization and common-area lighting).

The Measures Survey was performed primarily to collect data for a longitudinal impact evaluation of the Multifamily Conservation Programs. However, key data were gathered in this survey which address the quality of program measures as perceived by program participants after the passing of several years. The Measures Survey thus provides a complement to the shorter-term view of the two Customer Satisfaction Surveys.

**Survey 3:** In the Measures Survey, building owners and property managers answered a series of questions about changes at the residences that could influence the use of energy. The questions covered actions that may have affected tenant dwelling (residential) meters as well as common area (commercial) meters.

#### **3.8.1 CHANGES IN BUILDING OCCUPANCY**

Table 3-O supplies the number of buildings surveyed by group, and the number of residential units reported by the respondent. Program records show that, during the period 1986-1996, the combined Multifamily Conservation Programs served 1,754 buildings containing 33,606 residential units. The average number of units per building for the combined programs is 19.2. This compares closely to the Non-Participants randomly selected for the impact evaluation Control Groups, which averaged 20.4 units in size.

According to self-reports in survey interviews, Standard-Income Participants sampled for Survey 3 averaged 17.9 units per building, compared to the program average of 17.2 from 1986 through 1996. The Low-Income Participants sampled for Survey 3 were somewhat larger at 23.8 units per building, compared to the program average of 17.0 from 1986 through 1996. A review of sample records shows that 12 of the respondents represent buildings owned and operated by the Seattle Housing Authority. These public building projects have 301 tenant units and comprise 25% of units in the low-income respondent group.

In the interviews, owners and managers of Common-Area Lighting Program buildings in the Survey 3 sample reported having 1,299 residential units in their participating buildings. These data were checked against program records, because it was known that some cases represent projects containing multiple

buildings: one participating project had three buildings, another had seven, and the remainder represented one building per project. Differences were found between respondent report and service account records for 8 of 27 projects. These differences ranged from 1 to 5 units (averaging 3), with one exception: a three-building project containing 84 units which was reported as having 32. This error was probably due to the respondent having only one of the three buildings in mind when replying to the question on number of tenant units.

According to Seattle City Light account service records, the 27 projects in the Common-Area Lighting sample contain 35 buildings and 1,358 residential units. These sample buildings average 38.8 units per building, half again the size of the average program participant in 1993-1996, which has 24.6 units. The Common-Area Lighting Program has moved gradually toward serving smaller buildings each year. During the first two program years, trade allies brought in large projects with average sizes over 30 units (1993: 34 units, 1994: 31 units). During the next two years, although the program served one very large public-housing project (1995: 293 units), average project sizes drop closer to 20 units (1995: 23 units, 1996: 21 units). The sample for the Measures Survey was drawn from 1993 participants, best representing the larger buildings first brought into the program by trade allies.

**Table 3-O: Survey 3 Average Building Size and Participation Year by Sample**

Reported by Owner or Property Manager	Whole-Building Participants		Common-Area Participants	Non- Participants
	Standard-Income	Low-Income	Lighting	Control
Buildings Surveyed (projects)	192	51	35 (27)	62
Mean Residential Units	17.9	23.8	38.8	20.4
Median Units	12.0	10.0	34.0	14.0
Total Units Represented	3,442	1,212	1,358	1,265
Participation Year				**
1986	15	*	—	
1987	24	*	—	
1988	30	*	—	
1989	38	*	—	
1990	30	*	—	
1991	31	26	—	
1992	24	25	—	
1993	*	*	27 (projects)	
Control Group Composition	26	21	15	**

\* These program years were not sampled for the impact evaluation and hence the measures survey.

\*\* The Non-Participant group was randomly sampled to match the characteristics of each Participant group.

— The MF-CAL Program began operation in 1993.

The respondents stated that the number of tenant units per building did not change between the participation year and 1995 among the Low-Income and Common-Area Lighting Participants interviewed for Survey 3. Among the Standard-Income Program Participants, three added a new dwelling unit and one building added two units (in size, these buildings are in the 9-15 unit range). Among the Non-Participant buildings, between 1985 and 1995, one building removed two units from the tenant dwelling area and another building decreased in size by eleven units when the building was renovated in 1991. The majority of buildings in all groups were stable in size over the decade studied.

According to self-reports of the owners and property managers, 16 buildings selected for the impact evaluation Control Groups participated in a Seattle City Light Program between 1990 and 1995 “for insulation, windows, or lighting.” Cross-checks with program records yielded information about program participation for 12 of these buildings (75%). This information was taken into account in the impact analysis of energy usage during and after the 1993-1995 “participation” year, which occurred in each “Non-Participant” case *after* the samples had been selected.

Of the 5 Non-Participants selected for the Standard-Income Control Group, 4 took part in the Standard-Income Program in 1993-1995 after the impact evaluation samples were been drawn; 1 participated in the Low-Income Program in 1993. Of the 7 Non-Participants selected for the Low-Income Control Group, 4 took part in the Low-Income Program in 1993-1995 after the impact evaluation samples were been drawn; 1 participated in the Standard-Income Program in 1993. The other two buildings could not be located on any program roster, but the owner of one had a second building that did participate in an earlier year. The speculation is that this survey respondent confused the two buildings when asked about program participation. Finally, of the 4 Non-Participants selected for the Common-Area Lighting Control Group, 1 took part in the Common-Area Lighting Program in 1995, and 1 participated in the Standard-Income Program in 1995. The other two were not located on any program roster, but once again, an owner had a second building that did participate, and may have confused the two.

According to a prior Seattle City Light evaluation of multifamily building retrofits (Okumo 1991), a typical standard-income building has 789 square feet of rentable space per tenant unit, and a typical privately-owned low-income building has 825 square feet (public low-income housing tends to be larger at 891 square feet per unit, or approximately one 10'x10' bedroom). In addition, non-rentable square footage in common areas runs about 10-15% of total building spaces. A review of eleven common-area lighting buildings found conditioned spaces that run considerably larger, averaging 1,358 square feet per unit; non-conditioned space comprises 6% of the total space in these buildings (Humburgs 1993). This group of eleven included both apartments and condominiums, along with one retirement village.

The next display, Table 3-P, describes the tenant composition of the participating buildings responding to Survey 3. Three categories were called out for special estimation by the building owner or property manager: families with children, students, and elderly tenants. The remainder are adult tenants without children, who are neither students nor elderly, but presumably in their working years. Table 3-P demonstrates the differences in sub-populations served by the three programs (as described in Section 2.2).

**Table 3-P: Survey 3 Tenant Composition of Program Buildings**

	<b>Participant Status in 1995</b>	<b>Changed Since Participation Year</b>
<b>Standard-Income (whole building)</b>	<b>(n = 174)</b>	<b>(n = 30; 17%)</b>
Families with Children	7%	10%
Students	14	11
Elderly	14	22
Other	<u>64</u>	<u>57</u>
Total Tenants	100%	100%
<b>Low-Income (whole building)</b>	<b>(n = 51)</b>	<b>(n = 5; 10%)</b>
Families with Children	51%	41%
Students	12	12
Elderly	12	15
Other	<u>27</u>	<u>32</u>
Total Tenants	100%	100%
<b>Common-Area Lighting Only</b>	<b>(n = 24)</b>	<b>(n = 2; 8%)</b>
Families with Children	2%	10%
Students	8	5
Elderly	36	50
Other	<u>55</u>	<u>35</u>
Total Tenants	100%	100%

The 192 Standard-Income Program buildings surveyed had 3,442 residential units. Of the 174 participants providing information about the building's tenant composition, 17% reported changes between the participation year (1986-1992) and 1995. Among Standard-Income Program participants, the proportion of elderly declined somewhat, while the proportion of "Other" (presumably working adults without children) increased.

The 51 Low-Income Program buildings surveyed had 1,212 residential units. Of the 51 participants providing information about the building's tenant composition, 10% reported changes between the participation year (1991-1992) and 1995. Among Low-Income Program participants, the proportion of families with children increased, while the proportions in all other groups dropped slightly. Due to the

small number of buildings with changes reported by the owner or property manager, these changes may not be significant.

The 27 Common-Area Lighting Program projects surveyed had 35 buildings and 1,358 residential units. Of the 24 participants providing information about the buildings' tenant composition, 8% reported changes between the participation year (1993) and 1995. Among Common-Area Lighting Program participants, the proportion of elderly declined somewhat, while the proportion of "Other" (presumably adults without children) increased. Due to the small number of buildings with changes reported by the owner or property manager, these changes may not be significant.

The difference in typical multifamily building occupancy between the Low-Income and Standard-Income Programs is marked, specifically in the category of "families with children" versus the "other" category (which includes mainly adults without children). Half of all Low-Income Program tenants are families with children. Two-thirds of Standard-Income Program tenants are adults without children, compared to one-fourth among Low-Income Program tenants. Students and the elderly occupy multifamily buildings in similar proportions at both income levels. These differences reflect the population served by the Department of Housing and Human Services, where families with children predominate (and, as was noted, a quarter of units were in public-housing projects).

The whole-building and lighting programs also show notable differences in typical multifamily building occupancy. "Elderly" tenants comprise a third of occupants in Common-Area Lighting buildings, and another half are "other" tenants (adults without children). The dearth of students and families with children reflects the predominance of condominiums in this population served by the Common-Area Lighting Program during 1993.

**Implications:** The combined samples drawn from program participants for the Measures Survey represent 71% of all program participants during the selected years. Contacted customers who responded to the Measures Survey comprise 79% of those sampled. The Measures Survey therefore represents more than half (56%) of all participants during the selected program years ( $0.71 \times 0.79 = 0.56$ ). This high level of representation should lend the reader confidence in the findings of the Measures Survey. However, no formal tests were made of selection bias in the response to this survey.

**Update:** In 1997 the Common-Area Lighting Program served 24 large City public-housing authority buildings totaling 2,500 units, with an average size of 104 units. The other 105 buildings served in 1997 had 1,789 units, having an average size of 17 units. This shift away from primarily condominium buildings, toward serving public-housing tenants (58% of annual units), will shift the 1997 Common-Area Lighting profile toward the whole building Low-Income Program's tenant composition. In 1997-1998 the Common-Area Lighting Program is also serving more retirement home project types.

Meanwhile the whole-building Standard-Income Program has been enrolling significant numbers of City and County public-housing authority projects in recent years. These projects are located within the Seattle City Light service area but outside the Seattle City limits, and/or have resident income guidelines (at 80% of median) higher than those used by the Department of Housing and Human Services (DHHS) to qualify tenants for the Low-Income (whole building) conservation program. Serving public housing projects allows Seattle City Light to make conservation benefits available to citizens in the income “gap group”, between those able to afford weatherization loans and those in need who turn to the City for bill payment assistance.

At the same time, the whole-building Low-Income Program operated by DHHS with Seattle City Light funding has changed its financial policy. Owners who formerly received full weatherization grants are now required to share 20% of the costs. According to SCL and DHHS staff, this change has tipped the balance affecting the interests of private-housing owners, some of whom are switching to the standard-income program to avoid signing the DHHS covenant to freeze rents in the first year, and not to raise rents due to program improvements for three years.

In the late 1990s, the Low-Income Multifamily Program gradually approaches saturation of the available qualifying building stock. Meanwhile, multifamily housing in Seattle is increasingly being upgraded and converted from low-income to nonlow-income status, due to rising land-values and other economic pressures in the City. These developments are blurring the lines between low-income and nonlow-income programs at Seattle City Light. At the same time, in Seattle as across the country, HUD Section 8 covenants promulgated by Housing and Urban Development projects 30 years ago are running out. The City faces a serious loss of “affordable housing” for low-income and low moderate-income citizens. The question for Seattle City Light is the role of weatherization and lighting retrofit programs in preserving affordable housing in Seattle.

### **3.8.2 CHANGES IN HOUSE METER LOADS**

Between the program participation year and 1995, four Standard-Income Program participants report changing the common-area square footage served by the house meter. These buildings represent only 1% of the total residential units in this participant group. The types of changes added to the common area (two buildings) or expanded tenant spaces into the common area (two buildings), as follows:



Remodeled for longer hallway and stairs (18 sq.ft. added)  
Expanded lobby (40 sq.ft. added)  
Expanded some residential units (two buildings, square footage not stated)  
Made a minor change, adding a heater to the common area (1 sq.ft added in one non-participant building of the Standard-Income Control Group)

Table 3-Q describes the types of end use served by the commercial house meters in the multifamily buildings surveyed. The building owner or property manager was asked which equipment the building presently had in the common areas, that they believe was wired to a house meter. The electrical equipment loads are listed in descending order by frequency of occurrence. The first eight items were acquired with individual yes/no questions; the remainder were offered by respondents to an 'other' category. As a result, they may under-report actual incidence, depending as they do on individual voluntary recall. The 'other' items are listed in decreasing frequency of occurrence.

According to these reports, while exterior lighting is universally metered on the house accounts, in some buildings interior common area lighting is either not present or, in the absence of a house meter, is served by tenant meters; a fifth of the Low-Income Program participants said 'no' to this item.

Most whole-building program participants have laundry systems on the house meters, but a third of the Common-Area Lighting Program participants did not. This group also had far fewer laundry water heaters on house meters, and was the only group with a significant presence of elevators. These differences reflect the building types served by each program in 1994: low-income buildings are more likely to have exterior entries, and the lighting-only program serves many condominiums and larger-unit buildings with more tenant amenities in the units.

As far as changes in house meter loads since the year of program participation (or 1985 among non-participants), these were modest and occurred mainly in the categories of lighting and common laundry appliances. There were two exceptions, however. One Low-Income Program building had removed a tenant unit from the house meter during this period, establishing a separate residential meter for that unit. A Common-Area Lighting Program building added some new ventilation loads, as well. In all, 2% of the Participant buildings increased some proportion of the house-meter loads, while 1% decreased them somewhat. This compares to 3% of Non-Participants increasing house-meter loads to some extent. As these questions were exploratory, no quantitative information is available on the magnitude of these changes.

**Table 3-Q: Survey 3 Electrical Equipment on House Meters**

Buildings with End-Use on House Meter(s)	Whole-Building		Common-Area	Total Participants	Non- Participants
	Std.-Income (n=192)	Low-Income (n=51)	Lighting (n=27)	Treatment (n=270)	Control (n=62)
Exterior Lighting	100%	96%	96%	99%	100%
Interior Common Ltg.	92	80	96	90	97
Clothes Washers	93	88	67	89	82
Clothes Dryers	92	86	67	89	82
Laundry Water Heaters	85	80	52	81	80
Elevator	14%	12%	70%	19%	37%
Tenant Water Heaters	9	26	19	13	15
Swimming Pool Pumps	5	4	15	6	13
OTHER:					
Intercom System	2	0	7	2	0
Other Pumps & Fountain	2	0	4	1	3
Pool Heater	1%	2%	4%	1%	3%
Common Space Heat	1	2	0	1	3
Emergency & Exit Ltg. *	1	2	0	1	0
Fire Alarms **	1	0	4	1	0
Electric Gate	1	0	4	1	0
Garage Door	0%	0%	7%	1%	3%
Saunas	0	0	11	1	2
Recreation Room	1	0	0	0	2
Tenant Unit	1	0	0	0	2
Vending Machine	1	0	0	0	0
Ceramic Kiln & Refrig.	1%	0%	0%	0%	0%
Water Boiler	0	2	0	0	0
Hot/Cool Ventilation	0	0	4	0	0
Office Equipment	0	2	0	0	0

Notes: Replies of yes/no were requested to the first eight items; the remainder were offered by respondents to an 'other' category.

\* Emergency and exit lighting are required by code in buildings with interior corridors, and therefore would already be included under the 'interior common lighting' category.

\*\* Fire alarms are not mandatory, although smoke alarms within individual units are required equipment. Because this response was volunteered under 'other', other buildings may also have fire alarms.

**Implications:** Multifamily buildings typically experience little to no change in house meter loads over time. This suggests that energy savings from program measures will be persistent and stable over time from efficiency measures affecting house meter loads, subject to normal operations and maintenance (O&M) and the natural failure rates of installed equipment.

**Update:** As noted regarding building occupancy characteristics by program, the distinction among programs based on typical house meter loads may be blurred in recent and upcoming years. While few (if any) condominiums are served by the weatherization programs, buildings with low-income and low-moderate income (public housing) tenants are increasingly being served in the Seattle City Light programs rather than by DHHS. The primary target of the Common-Area Lighting Program continues to be condominiums.

### 3.8.3 CHANGES IN TENANT METER LOADS

Table 3-R focuses on the appliances within tenant units, and changes that have occurred since the year of program participation (or since 1985, for non-participants). Building owners and property managers were asked whether they had removed, added, or changed out any major electrical appliances in the individual tenant units since that time. All equipment items were volunteered in response to an open-ended question about types of electrical equipment changed. The items are listed in decreasing frequency of occurrence.

The average year of participation among the survey respondents was 1989 among Standard-Income, 1991 for Low-Income, and 1993 for Common-Area Lighting Program participants (overall weighted average, 1990). Thus the span of time covered by this question was 6 years, 3½ years, and 2 years, respectively, for each Participant group (overall weighted average, 5 years). For the Non-Participants the span was 10 years (1995 minus 1985).

With the exception of dishwashers, the preponderance of appliance modifications in the tenant areas have been change-outs of existing appliances for newer and more efficient models. This was true for Non-Participants as well as for Participants. Amongst the Standard-Income Program participants, however, about a third of the dishwashers described in Table 3-R were new additions, the other two-thirds being change-outs.

It is possible to estimate the proportion of appliances changed out per year, dividing the percentages in Table 3-R by the average number of years since participation. The Common-Area Lighting buildings are newer and only changed out water heaters (at the rate of 6% per year), garbage disposals (2%), and tenant unit clothes washers (2%).

Rates for the Standard-Income and Low-Income Programs were somewhat higher, the significant items being: water heaters (9-12%), refrigerators (5-6%), dish washers (3-4%), and ranges (3-4%). Non-Participants only met or exceeded the rate of 2% per year for: water heaters (5%) and dish washers (2%).

**Table 3-R: Survey 3 Tenant Appliances Changed Out or Added Since Program Participation Year**

Buildings Reporting Change	Whole-Building		Common-Area	Total Participants	Non- Participants
	Std.-Income (n=192)	Low-Income (n=51)	Lighting (n=27)	Treatment (n=270)	Control (n=62)
Water Heaters	51%	41%	11%	45%	45%
Refrigerators	34	18	0	27	11
Dish Washers	23	10	0	19	19
Ranges	21	12	0	17	13
Garbage Disposals	4%	0%	4%	3%	3%
Clothes Washers	2	4	4	2	3
Clothes Dryers	1	2	0	1	3
Space Heaters	1	2	0	1	0
Microwave Ovens	1	0	0	0	0

Table 3-S specifies the type of water heat system replaced when electric water heaters were added to or changed out in the tenant units, as specified in Table 3-R. In all but one control-group case, the new electric water heaters in individual tenant units replaced (changed out) old electric water tanks. One Non-participant added new individual water heaters to replace an electric central water heat system. A notably smaller percentage of Participants replaced gas water heaters with electric tanks.

**Table 3-S: Survey 3 Water Heat Type Replaced by Electric Water Heaters in Tenant Units**

Buildings Reporting Change	Whole-Building		Common-Area	Total Participants	Non- Participants
	Std.-Income (n=192)	Low-Income (n=51)	Lighting (n=27)	Treatment (n=270)	Control (n=62)
Replaced Electric Water Heat Tanks (or Central System)	44%	31%	4%	37%	24%
Replaced Individual Non-electric (gas) Tenant Water Heaters	5	8	7	6	21

**Implications:** This level of replacement activity for water heaters, refrigerators, dishwashers and ranges shows that many multifamily building owners and property managers invest in electric appliances. Seattle City Light has an interest in ensuring that replacement water heaters meet high efficiency standards. The Utility should seek out multifamily participants via the Energy Efficient Water Heater Program (EEWHRP), with this end in mind. The Utility may also want to note water heater replacement dates in the Conservation Tracking System, to ensure that future replacements (when measure lifetimes expire) are also made with high-efficiency equipment. A barrier which the program may need to overcome is the non-availability of suitable water heater models, e.g., squat under-counter 40-gallon tanks. Manufacturers currently have little incentive to design a high-efficiency model, and the current trend is toward tall, skinny 40-gallon tanks. The Utility should consider devising a strategy to encourage bulk replacement of all tanks in multifamily buildings, rather than individual spot replacements.

The Common-Area Lighting buildings seem to be changing out water heaters at a 6% annual rate, just slightly lower than expected; tanks with an average 12-year measure life would be replaced at 8% per year. The other types of appliance change-outs that were most common appear to occur less frequently than expected. Based on 1997 statistics about the U.S. appliance industry, one would expect 10% of garbage disposals (10-year measure life) to be replaced each year, compared to only 2% reported for the Common-Area Lighting buildings. Clothes washers, being changed out at 2% per year by program participants, are also being replaced less frequently than an average measure life would lead one to expect. (Note: Clothes dryers have an average 13-year life, for an expected annual change rate of 8%.)

Water heater change-out rates for the Standard-Income and Low-Income Programs were somewhat higher, occurring at a reported rate of 9-12% per year, compared to 8% expected. Again, based on 1997 statistics about the U.S. appliance industry, other change-outs occurred less frequently than expected. Refrigerator change-outs were reported at a rate of 5-6% per year, compared to 8% expected (13-year measure life); dish washers at 3-4% reported compared to 11% expected (9-year measure life); and electric ranges at 3-4% reported compared to 7% expected (15-year measure life).

Non-Participants reported change-outs that only met or exceeded the rate of 2% per year for water heaters (5%) and dish washers (2%). These rates are also lower than national statistics for the average time a product is owned by the original purchaser. The national statistics (source: "A Portrait of the U.S. Appliance Industry, 1997", EnergyStar Program, U.S. Department of Energy) may be based on ownership in single-family homes, and may have more limited application to multifamily buildings.

**Update:** In 1997-1998, Seattle City Light is offering the regional WashWise Program to encourage purchase of high-efficiency tumble action washers. This program is sponsored by the Northwest Energy Efficiency Alliance. Common-area laundries in multifamily buildings may provide a good target for this program, based on water and waste-water (sewer) savings to owners, who typically pay these master-metered bills. Refrigerators and electric dish washers also present a potential target for Utility programs designed to encourage the installation of high-efficiency models.

### 3.8.4 PROBLEMS WITH PROGRAM MEASURES

After asking building owners and property managers about changes to their buildings in loads and features, each was given the opportunity to comment on the measures installed by the program in which the sample building participated. The final question of the survey asked, “have any problems related to the measures installed cropped up in this building since the weatherization (lighting) work was done?” Since the survey was focused on changes affecting energy use, for input to regression equations for the impact analysis, this question was added mainly to provide closure. However, the findings reported in Table 3-T provides food for thought, specifically about the window measures selected and installed by the program.

In answer to the close-ended (yes/no) question, a surprisingly large 38% of Standard-Income Program participants said “yes,” compared to 12% of Low-Income Program and 4% of Common-Area Lighting Program participants. Customers were also asked if they would like a call from a City Light staff person to follow up on the problem. The responses by program were, respectively, 18%, 14%, and 4%.

Asking for a description of the problem claimed by each respondent, the survey interviewer transcribed open-ended comments for further examination. The text of these comments were later coded and clustered by program measure category for analysis. The following table provides the percentage of the participant group citing each problem type. Respondent comments were coded under each sub-category that applied, so these may be regarded as multiple response items. For three major categories (windows, lighting, and other), a summarizing proportion of unique responses in that category has been provided.

Two distinctly notable findings follow from this table. First, no comments were offered by any Standard-Income or Low-Income Program participant about the insulation measures installed in ceilings, walls, or under-floors. The complete absence of comment may betoken an ongoing satisfaction with the insulation, which is “out of sight and out of mind.”

Table 3-T: Survey 3 Open-ended Comments Volunteered on Measure Problems

Participant Comments Clustered by Type	Whole-Building				Common-Area	
	Std.-Income (n=192)		Low-income (n=51)		Lighting (n=27)	
(multiple responses)	Bldgs	Pct	Bldgs	Pct	Bldgs	Pct
<b>YES, HAD A PROBLEM</b>	73	38%	6	12%	1	4%
Windows	60	31%	1	2%	—	—
Lighting	9	5%	7	14%	2	7%
Other	23	12%	7	14%	1	4%
<b>YES, MAKE FOLLOW-UP CALL</b>	35	18%	7	14%	1	4%
<b>WINDOWS COMMENT</b>						
Poor Installation	10	5%	1	2%	—	—
Leakage Around Window	25	13	0	0	—	—
Broken Seal, Condensation	23	12	0	0	—	—
Broken Glass or Frame	3	2	0	0	—	—
Defects & Poor Quality	13	7	0	0	—	—
Replacement Needed	24	13	0	0	—	—
<b>CAULKING &amp; STRIPS COMMENT</b>						
Unfinished Installation	0	0%	4	8%	—	—
<b>MOISTURE &amp; VENTING COMMENT</b>						
Sweating	4	2%	2	4%	—	—
Mold	2	1	0	0	—	—
Problems Caused by Vents	2	1	0	0	—	—
Contractor Damage	1	0	0	0	—	—
<b>INSULATION</b> (water heater)	2	1	0	0	—	—
<b>SHOWERHEADS COMMENT</b>						
Work Poorly	5	3%	0	0%	—	—
Replaced	1	0	0	0	—	—
<b>LIGHTING COMMENT</b>						
Unfinished Installation	0	0%	1	2%	0	0%
Not Working	2	1	1	2	2	7%
Bad Ballast	1	0	0	0	0	0%
Broken	1	0	2	4	0	0%
Insufficient Light	1	0	3	6	0	0%
Replacement Problems	4	2	0	0	0	0%
<b>WANT PROGRAM FOLLOW-UP</b>	11	6%	1	2%	1	4%
<b>WANT INFORMATION</b>	2	1%	0	0%	1	4%
<b>HAD NO PROBLEMS</b>	9	5%	0	0%	0	0%
<b>SATISFIED WITH PROGRAM</b>	10	5%	3	6%	0	0%

Second, owners and property managers volunteered details on problems with windows to a disturbing degree among former participants in the Standard-Income Program. One-third of all buildings experienced window problems, citing leakage around the windows of air and water, broken seals leading to condensation between the double panes, and the need to have at least some of the windows replaced by the contractors.

The only other noticeable problems mentioned by owners and property managers relate to some unfinished caulking for 8% of Low-Income Program participants, and difficulties with the lighting measure for 14% of this group. Seven buildings have some lighting which was not completely installed, is not working, is broken, or provides insufficient light. Among the Standard-Income Program participants, nine buildings have had similar lighting problems, including also bad ballasts and difficulty obtaining replacement bulbs.

Following is a representative sampling of the verbatim comments supplied by Survey 3 respondents.

***Some window frames leak rain and cold:***

- “Windows leak when it rains.”
- “The frames on some of the double pane windows are leaking water.”
- “Two patio doors installed leak on the top of the frame and need to be repaired.”
- “Had to replace 50% of them [windows].”
- “Contractors replaced many leaky windows.”
- “Windows leak in all the buildings but contractors replace [them].”
- “Just a note that double pane windows have aluminum frame that lets the cold in.”

***Some double-pane seals have broken:***

- “Some of the seals on the double pane windows broke and moisture got between the window [pane]s.”
- “Extreme condensation between the panes of the windows.”
- “Seals broke, had to change some, in fact they are coming out next week to fit another one.”
- “Some windows have lost their seal. Have replaced them, but am concerned about the new ones.”
- “Windows have failed manufacturing. Really bad. The seals are not good.”
- “Terrible mold, installers put wrong chemical, but Seattle City Light already took care of it.”
- “Windows manufacturing process [problem]. The company went out of business.”



***Some window features were substandard:***

- “Bathroom windows are coming off the seals on the inside. Screens have broken off.”
- “The springs rusted and broke, had to replace some.”
- “Spring mechanism has kept failing in window.”
- “The sliding in one of the windows is not working.”
- “Windows didn’t close.”
- “Screws in windows rusted. Some of the windows don’t work right.”
- “Windows installed with rubber strip to hold them in, and they are starting to pull out.”
- “Minor window counter-balance problems.”

***Some buildings have ventilation problems:***

- “Tenants have to leave windows open to let out moisture, which defeats the purpose of weatherization.”
- “[Had to] redo dryer venting due to improper ventilation installed by Seattle City Light.
- “Contractor cut holes in the roof and it was not done right so caused leakage. Cost [owner] a whole new roof.”

***Some contractors and window styles were substandard:***

- “Didn’t supply screens, did not do a good job, wouldn’t stand by their work. Very upset.”
- “Installers damaged window frames.”
- “Was very upset with the contractor that did the windows in this building. Was very pleased with the contractor that did [their] six-plex.”
- “Lousy job done in windows, hack-up job.”
- “Was not happy with the job that was done on the windows. It [the building] was built in 1906 and the architecture was destroyed, and [the present owner] would not have made the decisions that were made [by the prior owner].”

***Some common-area lights are unsatisfactory:***

- “Outdoor lighting was never finished.”
- “Exterior light timer has gone out.”
- “Light timers were installed, and one in storage room and one in work shop do not work.”
- “Ballasts were all bad in the hallway lighting, had to replace all of them.”
- “Lights in main lobby dimming out in cold weather.”
- “Compact fluorescent light fixtures: if light burns out and is not changed, have a problem with the whole fixture.”
- “Light fixture broke when changed bulb.”
- “Interior lighting is very poor; makes the interior common areas too dark.”

- “Don't like the light fixtures in the laundry room, doesn't give out enough light.”
- “Light fixtures are poor quality.”
- “Just a note that ten interior light fixtures (in common areas) were removed and replaced with more efficient fixtures in [the 8th year after program participation].”

***And on the other hand, many participants liked the program:***

- “Was very pleased with the program. The bills have been reduced.”
- “Has noticed a change in the heat bills. Very good program.”
- “Tenants really like the double pane windows; good program.”
- “It helps reduce the heat bills and it stays warmer longer, the windows are very effective. Was very pleased with the program.”
- “No problems, [owner] just wanted to stated that the City Light did a great job and it is a marvelous program.”
- “...Like the program but suggest better screening of contractors to get a higher quality of workmanship.”

**Implications:** Standard-Income Program files were researched to link problem comments to the type of windows installed, manufacturer, and installing contractor. The following patterns emerged:

1. Problems with “broken seals and condensation,” leading to the need for post-program replacements, are associated with aluminum-framed windows installed in 1987-1989. These windows were manufactured by Alpine Industries, Insulate Industries, and Northwest Aluminum, and were installed by various local contractors. The projects included both full replacements (glass plus frame) and window conversions (where double-paned glass is installed in existing frames).
2. Jobs eliciting comments about “poor installation” are also associated with aluminum windows installed during 1988-1989, both replacements and conversions, by various contractors.
3. Comments about “defects and poor quality,” by contrast, clustered among buildings where vinyl replacement windows were installed during 1989-1991 (and one in 1986). Various manufacturers supplied these windows.
4. Problems with water and air “leakage around windows” requiring post-program replacements, presumably under warranty, occurred as the result of 1991-1992 vinyl-window installations. Most of these windows went into one complex of eight buildings, were full replacements installed by a single contractor, and were produced by Insulate Industries.

SCL staff feel they understand the issues involved with the eight-building complex, and judge that the manufacturer of those windows was not the source of the problems. Rather, the contractor's staff had

reason to be fearful of gang crime and other violence at this location. Work within tenant units exposed them to drug use activities and other unsafe conditions. The contractor called in extra supervision, including SCL program staff, to provide security, but nonetheless the employees did hasty work to get in and out quickly. This may have led to somewhat substandard work, although technically the program specifications were met and the project passed inspections. This project demonstrates one of the “real-world” conditions under which the program operates and meets natural limitations.

In other cases of leakage around windows, the question remains whether the window product or the installation method could be responsible. In the single-family weatherization programs, a limited number of windows are installed, each individually measured. In multifamily buildings, larger numbers are mass produced to uniform measurements. Replacement windows are bound to fill openings that are not as uniform, with varying degrees of gaps to be filled. The program specifications require “drip caps” for all installed windows, and program inspectors verify that each finished window has either a nailing flange or flashing along the top edge, where there is no overhang. Caulking, filler, and trim materials are to be sloped to ensure water run-off. Screw penetrations are to be sealed, and caulking is applied around the outside edge of window frames.

SCL program auditors document pre-existing leakage and stains, because pre-existing wall problems can cause leakage to continue, independently of the window replacements. For example, one contractor brought in a structural engineer to establish that leakage at the stucco building in question was not related to the program’s window replacement. Staff are firm in their belief that generally the cause of air and water leakage is faulty or degraded wall construction, which cannot be remedied by the window retrofit itself. They do say, however, that customers typically “blame the last one who touched the building.”

**Update:** Seattle City Light, in developing its conservation programs, has attempted to lead the market toward more efficient building practices in new construction, and to retrofit existing buildings with high-efficiency shell improvements. An unwanted side effect to these market transformation efforts has been the early installation of window and lighting products that had not yet achieved their full promise.

During the early years of the Multifamily Conservation Programs (1986-1987 pilot and 1988-1989 full-scale program), apparently the available aluminum-framed windows did not all have durable double-pane seals. Whether the seals broke due to inadequate manufacturing, or due to handling and installation stresses, many have required replacement over subsequent years. The issue of later replacements will also be addressed in Section 4.8.5 of this report. Early aluminum windows did not have effective thermal breaks, and the frame material itself transmitted more heat (cold) than the earlier generation of wood windows. It has been argued that, compared to wood frames, aluminum frames distort under the weight of the glass, can torque when handled (potentially breaking seals between panes), and can get dented or damaged in handling. Vinyl frames, by comparison, do not dent, can have better structural integrity, and

can be stronger and more flexible (protecting between-pane seals). Fortunately, in the 1990s the program moved away from aluminum frames as more efficient vinyl windows were developed, with rare gas fills and wider “dead-air spaces.” It appears, however, that the early vinyl windows themselves were not entirely without quality problems, based on comments about product defects.

Seattle City Light needs to develop a strategy for following-up on specific buildings receiving the current generation of vinyl window products, to determine whether problems observed in 1991-1992 windows have “shaken out” as high-efficiency ( $U \leq 0.40$ ) products matured. A strategy should also be developed for follow-on services to 1997-1998 customers. The Utility might even consider investigating the economics of offering a new generation of vinyl replacement windows, at some future time, to customers who participated in the Multifamily Conservation Programs in 1986-1990 when aluminum windows were sponsored.

There remains the question why participants in the 1991-1992 Low-Income Program volunteered statements on far fewer post-installation problems with windows. The Department of Housing and Human Services, which operates the Low-Income Program, does require foam to be installed over the old aluminum frame perimeter; this may serve to reduce some drafts, water leakage, and thermal transmission. DHHS also provides this weatherization program in conjunction with rehabilitation services, which address structural deficiencies that could lead to leakage. Seattle City Light should consider how equivalent window-opening rehabilitation could be incorporated into the Standard-Income program to increase the quality of window retrofits, the building stock, and ultimately the satisfaction of building owners. The two City Departments should also consider the extent to which a process which emphasizes low (competitive) bids has contributed to post-program window problems in the Standard-Income Program.

### **3.8.5 INSTALLATION OF NON-PROGRAM MEASURES**

Earlier in the interview, the building owners and property managers were asked whether the measures installed by the SCL Program are still in place. If measures had been removed and not replaced with equipment of a similar efficiency, the respondent was also asked to report how many were removed and what proportion this represents of the measures installed by the Program. Table 3-U presents extrapolations based upon these owner/manager self-reports. The proportions are based upon the average quantity of the measures installed by each program (available from impact evaluation records), and on the respondent’s perception that the replacement is “less efficient” than the program measure.

Note that the respondent’s perception is subjective about whether a replaced window is “less efficient” than the original program window. It is possible that a respondent may feel a vinyl frame, for example, is

inferior to an aluminum frame, when in fact the thermal properties are better. Without further investigation, the information presented below is suggestive but not verified by objective data.

The close-ended questions reported in Table 3-U provide firmer estimates of windows requiring replacement due to defects in materials or workmanship. However, replacements by the contractor with windows of identical efficiency to the program windows are probably not reported in these numbers, due to the way the question was worded. Among Standard-Income Program participants, in 17 buildings (9% of respondents) defective windows had already been removed and replaced with windows that the owner or manager perceived to be “less efficient” than the program windows; most of these replaced all of the program-installed windows. Among the 192 participants in total, an estimated 11% of the program-installed windows were removed and replaced with “less efficient” measures between the participation year (1986-1992) and the end of 1995, when the survey was conducted. This level of replacement took place over an average 6-year time span. None of the 51 Low-Income Program participants volunteered descriptions of problems with or replacements of program windows (over an average 3.5-year span).

**Table 3-U: Survey 3 Participant Installation of “Less Efficient” Measures**

<b>Pct. of Program Measures Removed &amp; Replaced by Participants</b>	<b>Whole-Building</b>		<b>Common-Area</b>
	<b>Std.-Income (n=192)</b>	<b>Low-income (n=51)</b>	<b>Lighting (n=27)</b>
Double-paned Windows	11%	0%	—
Exterior Lighting Fixtures & Bulbs	4	9	0
Interior Lighting Fixtures & Bulbs	4	0	0
Showerheads	10	6	—

Table 3-U also suggests a slight erosion in the persistence of lighting measures among the whole-building program participants, but none among the Common-Area Lighting group. These differences may not be significant, as the mean length of time between participation and the interview was 6 years for the Standard-Income Program, 3.5 years for the Low-Income Program, and 2 years for the Common-Area Lighting Program.

Showerheads were removed and replaced in 10% of the Standard-Income and 6% of the Low-Income Program tenant units. Some owners and managers complained that the showerheads worked poorly. Following are some of the verbatim comments supplied by Survey 3 respondents.

- “Had problems with the efficient flow showerheads, so [owner] removed them all and replaced them with [the] old ones.”
- “Showerheads didn’t work right.”

- “Problems with the showerheads: Leaking, etc.”
- “...Wasn’t too happy about the showerheads, as far as [owner] knew they are still in

At the same time that Participants received efficient conservation measures through the Multifamily Conservation Programs, Non-Participants were adding new or changing out existing equipment in their buildings. Table 3-V describes some of this retrofit or upgrade activity on the part of Non-Participants. As may be recalled, sixteen “Control Group” buildings (26%) reported having participated in a Seattle City Light program for insulation, windows, or lighting. Only in twelve cases could this participation during the prior two years be confirmed from program records. Those twelve cases have been removed before calculating the proportions in Table 3-V.

**Table 3-V: Survey 3 Non-Participant Installation of “More Efficient” Equipment**

Pct. of Non-Participant Buildings (n=50) with End Use Modified	Additions		Change-outs	
	Added Equipment	Judged More Efficient	Changed Equipment	Judged More Efficient
Double-paned Windows	2%	2%	8%	6%
Exterior Lighting Fixtures & Bulbs	16	8	26	24
Interior Lighting Fixtures & Bulbs	4	2	26	24
Showerheads	6	4	62	58

The level of building equipment change-outs for “more efficient” measures is as expected for a control group. The multifamily sector is generally regarded as conservative in making such investments, especially in expensive measures such as double-paned windows. Although the interviewer’s lead-in to the equipment questions did not repeat the time span of interest, earlier questions specified “since 1985”. The responses to these questions about change may reflect a decade of modifications, in which case the average annual rates of activity would be significantly lower than shown, ranging rather from 1% (windows) to 6% (showerheads) of building equipment being upgraded by category each year. Most program participants upgrade 100% of equipment in a category, if they receive a measure at all through Seattle City Light’s programs.

The proportion of showerheads being changed out reflects in part the penetration of Seattle City Light’s Home Water Savers Program, which in 1993-1995 supplied efficient-flow showerheads at no cost to 40% of all multifamily buildings in the Utility’s service area (47% of buildings with electric water heat). Combined with showerheads supplied by the Multifamily Conservation Programs, over 51% of all Seattle multifamily buildings received showerhead upgrades from Utility programs during 1993-1995 (59% of buildings with electric water heat). The “Ondine” model provided to multifamily participants (manufactured by Interbath) flows at a rate that is 0.5 gallons per minute less than the maximum allowed

by State Plumbing Code. As they have since 1986, the Multifamily Conservation Programs continue to install efficient showerheads in participating buildings during 1996-1998.

**Implications:** Between 1986 and 1992 (the years sampled for Survey 3 from Standard-Income participants), \$6.4 million was expended on Program measures, of which about 80% was spent for replacement and conversion windows. If 11% of these windows had to be replaced again subsequent to program participation, in 1995 they would represent about \$560,000 of products. In point of fact, only the glass insert does get replaced under warranty (as in a “conversion”), at probably 2/3 the original window replacement cost. Over a ten-year period, therefore, to the contractor and manufacturer this warranty work may represent closer to \$626,000 of products ( $\$6.4 \times 80\% \times 11\% \times 10/6 \times 2/3$ ), not accounting for inflation. The proportion replaced under warranty is not known, but the expense to contractors and customers has been sizable, and costs will continue to accrue until warranty lifetimes expire. After that point, customers will be on their own to replace failed units.

During 1993 through 1997, another \$12.5 million has been expended on Standard-Income Program (whole-building) measures. If post-program replacements have continued being a problem, at 11% of program window measures in the sixth year post-program, this would imply cumulative ten-year replacement costs in the ballpark of \$1,222,000 ( $\$12.5 \times 80\% \times 11\% \times 10/6 \times 2/3$ ). However, SCL program staff feel that in recent years the rate of warranty replacements for vinyl windows has been significantly lower than for the preceding aluminum and vinyl windows. This hypothesis invites testing.

It is not possible to extrapolate from Survey 3 whether that level of post-program replacement would have continued after 1992, or what the rate would have been over the life of the measure. All measures have a median residual life, at which time 50% would have been removed due to product failure, removal, remodel, or demolition. The median residual life for window retrofits is 30 years. Each product type also has a particular curve to express the expected rate of loss in each year after installation. A totally flat curve would lead one to expect 50% of retrofitted windows to have failed after 30 years, at a steady rate of 1.7% per year, or 10.2% over 6 years. Perhaps an 11% failure rate is just to be expected. Then the question becomes more a matter of why owners and managers of Low-Income Program participant buildings did not notice or report window failures at the expected 6% rate ( $1.7\% \times 3.5$  years).

No attempt has been made in this analysis to match the extrapolated replacement rates to any expected curve, flat or otherwise. However, there is a natural comparison between the Standard-Income and Low-Income Programs. The Low-Income sample was drawn just from 1991-1992 participants, whereas the Standard-Income sample includes participants from the 1986-1992 program years. Comparing just the 1991-1992 cases, the Low-Income Program respondents produced 1 comment about a window problem (2% of 51 in the sample), while the Standard-Income Program participants generated 14 comments, 8 cases reflecting buildings in a single multifamily complex (25% of 55 in the sample, or 15% treating the 8 cases as one large building). Because the difference is maintained in this comparison, the

recommendation is reiterated that the Utility pursue the question of why participants in the 1991-1992 Low-Income Program volunteered statements on far fewer post-installation problems with windows.

**Update:** It is reasonable to assume that contractors and manufacturers embed into the original price of products their projected cost of warranty replacements. Postulating a 1.7% annual failure rate, and a glass insert replacement cost of perhaps 2/3 the original window cost (which included the frame as well), warranty replacements could add about 1% per year to the original cost, incurred over the life of the warranty. A ten-year warranty might add nearly 11% to original prices, while a “lifetime” warranty could add 34%, assuming a 30-year lifetime for the typical window. Of course, some contractors and manufacturers do not stay in business that long, and not all building owners seek out warranty replacement for failed window units. Nonetheless, when contractors compete on low-cost bids, length of warranty liability is one of the limiting factors.

Seattle City Light should consider a strategy to follow up on specific buildings receiving post-program replacements, to find out whether the new windows actually were “less efficient,” as some owners and managers perceive them. Perhaps a focus group of DHHS and SCL program staff should address the issues of rehabilitation and window installation methods. This group could also compare staff insights into customer perceptions about the presence or absence of window problems. Since it appears that post-program replacements in the Standard-Income group reflect roughly what might be expected from a natural flat-rate of product failures, it is possible that similar failures are being overlooked in former participants of the Low-Income Program. Survey 3 has raised some unanswered questions that should be explored with windows installed during the past five years (1993-1997), to ensure that program quality standards are upheld.

What is more, Seattle City Light is left with a long-term concern about aluminum frame windows that were installed during the 1980s, not only in multifamily buildings but also in the single-family/multiplex sector. It may not be cost-effective at this time to introduce a *re-retrofit* program, but the Utility has been in the weatherization business since 1981 for single-family homes and 1986 for multifamily buildings; many program measures are already 12 to 18 years old. The 30-year median residual life of windows implies that many windows will naturally have failed by now (up to 20-30%). The Utility should put serious consideration into a new kind of spot-replacement rebate program that could help homeowners and multifamily building owners to re-fit high-efficiency windows into openings where individual aluminum framed windows have failed. As a rebate alternative, lending institutions are becoming more active in offering below-market rate energy loans, with money now readily available. The design of such a new-generation program would be challenging, to ensure cost-effectiveness, but it is time the Utility considered next steps as the lifetimes of sponsored window retrofits tick away.



## 4. Conclusions and Recommendations

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### 4.1 Overall Satisfaction with the Program

City Light's participating customers are extremely satisfied with the Multifamily Programs. Participating more than once is a tacit reflection of satisfaction with the program. Recommending the program to a friend or business associate reflects strong satisfaction and the expectation that the other person will likewise have a positive experience. People generally will not put their own reputation at risk by making such a recommendation, especially to a business associate, if a negative experience might result to reflect back upon their relationship. On all general measures, from the viewpoint of City Light's customers, these are very successful programs.

**Suggested Action:** None.

### 4.2 Satisfaction with Program Processes

#### 4.2.1 PROGRAM STEPS AND TIMELINESS OF PROGRAM SERVICES

Most customers feel the program processes of installation, monitoring, inspection, warranty work, and financing went smoothly. The long waiting list is clearly the greatest problem with the Multifamily Conservation Program for standard-income buildings, in the viewpoint of survey respondents. This program has typically been over-subscribed since its inception, even though Seattle City Light does not advertise multifamily (whole-building) retrofit services or incentives. Whole-building customers usually hear about the program by word of mouth from contractors and business associates. Before receiving services from the Standard-Income Program, the customer's name is placed on a waiting list.

Customers feel that waiting over a year for whole-building program services is excessive and not completely satisfactory, but tolerable for most. Lighting-only customers feel the same way about waiting up to eight months for program services.

**Suggested Action:** While customers may tolerate these long waits, they are clearly not desirable. To optimize the satisfaction of participants in the Multifamily Conservation Programs, reducing the waiting period for services is a major action that the program operators could take to improve the program.

In the most recent program year (1997) the whole-building program continues to maintain a waiting list, with delays of about a year between program application and initial building audit. At the end of 1997, applications spiked upward and the most recent group to apply will likely wait 1.5 years to be served. According to program staff, customers are very eager when their time comes up on the waiting list. This can help to alleviate delays and procrastination in getting and selecting bids. From the perspective of staff, this side-effect of maintaining a waiting list has a positive impact on managing whole-building projects, which can involve up to three contractors, numerous on-site visits, and ongoing telephone coordination. However, customers still often delay deciding to authorize work and commit funds until late in the year, close to commencement of the winter heating season.

**Suggested Action:** In 1998, SCL should begin to offer “early action” monetary incentives for the Multifamily Conservation Programs. Customer delays are the source of SCL program operators’ interest in implementing an increased incentive to encourage customers to act within 30 days of receiving contractor bids. The intent is to even out associated workloads during the calendar year for SCL staff as well as contractors.

During 1996-1997, SCL staff for the Common-Area Lighting Program have usually been the first out on a job. The program is advertised and SCL markets it aggressively, yet demand for the program is lower in spite of these actions. Due to the decline in niche market demand, there is no waiting list for the common-area lighting-only program.

**Suggested Action:** None.

#### **4.2.2 CONTRACTING AND PROGRAM PROCESSES**

Regarding financing options, the main change since 1993 has been in the whole-building retrofit program. Formerly customers were offered a sliding scale discount option for “early payment”. In 1995, the sliding scale option was dropped, retaining only the 50% discount for first-year payoff.

With the change from a sliding-scale to a one-year option on the discount, it became more important that customers be on top of the expiration date for this offer. As the survey showed for 1994 participants, over a third did not know when their one-year term expired. In response to these findings, in 1995 program staff discussed methods to send out a letter or postcard on a routine basis, within one year of program participation, to help participants remember this key date.

As of 1997, there has been no progress on developing a routine to communicate with customers about the one-year contract anniversary.

**Suggested Action:** Follow-up activities could be made easier by use of the new Conservation Tracking System, which can be customized to routinely produce the appropriate documents at a set time after program completion. In the meantime, it is important that the Contracts Unit begin mailing out reminders and calling former Multifamily Program customers about their one-year contract option.

### **4.3 Satisfaction with SCL Staff Interaction**

With the 1995 move downtown, all field staff acquired electronic voice mail and the ability to pick up messages from remote locations. On the down side, customer calls are less often picked up by a live person than in the past. However, most survey respondents in both waves reported that it was easy to communicate with program field staff.

**Suggested Action:** None.

### **4.4 Satisfaction with the Contractors**

To install program-sponsored measures, customers work with one, two, or up to three different contracting companies, depending on the categories of measures selected.

The showerheads have been a “one-size-fits-all” type of measure which could be installed immediately. Likewise, insulation as a measure is relatively low in cost; the materials can be bought “off the shelf” by the contractor, and installed without much delay. Once installed, the insulation is generally “out of sight and out of mind” for the purchasing customer.

Windows are much higher in cost and must be custom-ordered by the contractor from a manufacturer. Because multifamily buildings require multiple windows of similar dimensions, there are economies of scale compared to ordering windows for a single-family home. However, ordering multiples of fixed-dimension windows leads to more situations where individual windows must be fitted into openings that vary slightly from the specified dimensions, due to minor variations in building construction, settling of buildings over time, and subsequent frame distortion. Acquiring and installing windows takes more time for contractors than does insulation. For better or poorer, windows remain highly visible once installed.

Common-area lighting measures share with windows the attribute of being customized. The lack of suitable high-efficiency fixtures and lamps on hand in the Seattle area has slowed progress in this aspect of the program. In 1995, and still in 1997, the local lighting market is not yet mature for these fixtures.

#### 4.4.1 CONTRACTOR TIME AND SCHEDULING

Regarding lighting job scheduling, the time required to order and get lighting materials, and the time to install lighting measures, the whole-building customers were far from completely satisfied with their contractors in 1994. Compared to other program measures, this is a clear deficiency that required improvement at the time of the Customer Satisfaction Surveys. At the same time, the lighting-only customers grew somewhat less satisfied with scheduling and installation times. Many customers appear to expect lighting measures to be installed 'as soon as possible', with their perceptual timeline beginning when they verbally agree to or send in a signed bid. This is certainly an area to which program operators should attend.

**Suggested Action:** Program operators should provide participating owners with a written, as well as verbal, description of the expected timeline for receiving their lighting measures. This timeline would clearly state that materials will not be ordered by the contractor until after the contract has been signed by all parties and written authorization has been received by the contractor.

In 1994 when the surveyed customers were participating in the Multifamily Conservation Programs, start up of the Warm Home Program for single-family weatherization retrofits significantly increased contractor workloads. The same insulation and window contractors served both programs. Being pulled between increased program constituencies strained their capacity, which was reflected in a slow-down of work on multifamily projects in the latter half of 1994. This problem was ameliorated in 1996 when the Warm Home Program dropped funding for window measures, and demand dropped precipitously. Multifamily weatherization job starts in 1997 dropped off by half, as well.

Over the years, Seattle City Light has made efforts to smooth workloads out across seasons to reduce workload peaks for contractors and program staff in the autumn and winter months. In the single-family weatherization program, the Utility has offered an "off-peak" bonus to reduce the cost for window bids selected during the spring and summer. In the Multifamily Programs, however, the slower progress of lighting measures impedes program projects and reduces the effectiveness of workload smoothing efforts.

The Utility has also tried to improve the range of customer choices for lighting fixtures by introducing them to the regional Lighting Design Lab run by Seattle City Light. Staff observe, however, that customer decision-making also slows down lighting projects, due to the number of choices. It is a challenge for the Multifamily Programs to offer good, complete information to support customer choices while managing the flow of workloads for Utility staff and contractors.

**Suggested Action:** Beginning in 1998, SCL should begin to offer "early action" monetary incentives for the Multifamily Conservation Programs. As stated in 4.2.1, this incentive money is paid specifically to

encourage customers to act within 30 days of receiving contractor bids. The intent is to even out associated workloads for SCL staff as well as contractors, throughout the calendar year.

#### **4.4.2 CONTRACTOR QUALITY OF WORK**

Program customers were very satisfied with the work of the Seattle Conservation Corps, which installed the showerhead measures. Their work was judged by most participants to be “excellent.” According to City Light program staff, the Conservation Corps was in and out of each building within days of receiving each project assignment. Kudos are due to this fine City program which provides employment opportunities to formerly-homeless citizens in need of assistance.

**Suggested Action:** The EMSD director and Manager of Community Conservation should provide kudos to the Seattle Conservation Corps and SCC supervisory staff. The kudos should recognize SCC’s excellent work installing showerheads for the Multifamily Conservation Programs while achieving their core mission of employment service to their client-workers. Appropriate recognition might also be directed to executives in Seattle City Light and Seattle Public Utilities, as well as interested parties in the Executive and Legislative branches of City government.

In 1997, the Seattle Conservation Corps was no longer installing showerheads for Seattle City Light’s conservation programs. With the penetration of the Home Water Savers Program into the multifamily sector, the potential pool for this measure has been nearly saturated and few new program participants are found to need efficient showerhead measures.

Regarding quality of work, the survey respondents did not uniformly receive excellence from their weatherization and lighting contractors. Customers perceived deficiencies in the lighting contractors for both programs. Upon examination, follow-on queries about whether the problem was resolved to the customer’s satisfaction showed that most were. Unfortunately, the Customer Satisfaction Surveys were not designed to probe into the types of issues and problems customers may have had, just on whether resolution was reached.

**Suggested Action:** None.

#### **4.4.3 CONTRACTOR INFORMATION**

Regarding information on the quality of materials, few insulation customers feel they have received excellent service from the contractors. Only about half of the customers of the window and lighting contractors believe they have received excellent information about the quality of materials.

During 1994, Utility staff were being rotated through the Multifamily Conservation Program for standard-income buildings (from other Seattle City Light conservation programs). Staff rotations may have disrupted the “chain of communications” between staff, contractors, and customers to an uncertain extent.

In 1997, SCL Program staff indicate they have expanded their description of the windows installation process for customers, covering both methods and what contractors are proposing for each job. Staff give special attention to the issue of insert windows, as in buildings having marblecrete exterior construction. Window contractors are required to provide sketches with their bids showing the proposed manner of installation. Customers are given examples of nearby Program participant buildings to look at, to see how their measures may turn out, both for windows and lighting.

**Suggested Action:** Both Multifamily Conservation Programs need to continually monitor the quality of information customers receive regarding, whether the information is provided by contractors or program staff. The goal is to assure that all customers receive information on cost and quality that they perceive to be excellent.

#### 4.4.4 CONTRACTOR COMMUNICATIONS

In 1994, customers felt that window contractors were substandard on communicating about job scheduling, overall installation time, and quality of work. This was clearly an area of deficiency for the whole-building program that required attention.

As a general policy, Seattle City Light staff strive to create an atmosphere of contact and follow-up with customers. The key messages are to emphasize that Utility staff are available when contractors cannot be, that the Utility is there to assist contractors on proactively keeping customers apprised of project progress, and that if communications with the contractor are not clear, Utility staff will seek out information customers need.

**Suggested Action:** The Utility needs established, built-in program processes and re-contact intervals to be invoked during times of stress for contractors. These processes would place a high priority for program staff to “take up the slack” for contractors, by staying in close contact with customers and smoothing the way. When contractors fail to keep up communications, program staff can explain the reason for delays, assure customers that their project is important, and that the Utility is keeping watch on the project.

According to the field manager, by 1997 staff of the Multifamily Conservation Programs have in fact become quite adept at managing the communications flow between contractors and customers. Contractor communications are a continuing problem, however. Two types of potential remedies should

be considered to keep communications up-front about current contractor workloads and to prevent overloading problems.

**Suggested Action:** First, data should be developed in 1998 for each project on the length of intervals between key dates, such as from contract signature to passed inspections. The length of key intervals for a groups of recent projects undertaken by each contractor can be made available to staff and customers at the time new bids are being reviewed. This may enable customers to select contractors who are more on target for keeping their projects moving, and may help reduce overloads for popular contractors.

A second remedy, applied to tardy contractors, is to assess automatic failures ("auto-fails"), which occur when a passed inspection does not take place within 90 days of contract signature and when no extension request has been submitted by the contractor. This remedy, which can mean monetary fines, is periodically implemented in other Seattle City Light programs. It can be an effective incentive to contractors to keep jobs on schedule, thus preserving important profit margins.

The new computerized Conservation Tracking System is expected to help program staff stay on top of project progress, and to help the field manager identify problem patterns with contractors.

#### **4.5 Suggestions for Improving the Program**

Sufficient need exists among customers for the Utility to consider several possible improvements to lighting services in the Multifamily Conservation Programs as operated in 1994. Staff have an educational role in informing customers about comparable lighting levels, lighting operations, and lighting maintenance. Some owners apparently do not look at or understand the product 'cut' sheets that describe the lighting fixtures to be installed, leading to misunderstandings and some dissatisfaction.

**Suggested Action:** Program staff should continue to ensure that contractors routinely offer customers the opportunity to view sample books of efficient lighting products that qualify for program incentives. Program staff should especially draw the attention of each owner to, and help them understand, the product 'cut' sheets.

Multifamily building personnel (whether owner, property manager, or resident manager) who are responsible for purchasing and installing replacement lights should receive literature on operations and maintenance, as well as sources of re-stock lamps.

The programs should consider rebating a limited supply of replacement lamps with each project. Alternatively, each completed project should be enrolled in a follow-up program which contacts building management at set intervals to prompt proper maintenance and provide updated resupply information.

In 1996 the Multifamily Conservation Programs began distributing a lighting operations and maintenance fact sheet to participating customers. A formal follow-up program has not yet been established, although the new Conservation Tracking System will be capable of facilitating such a service.

## **4.6 Changes in Program Buildings and Measures**

The Customer Satisfaction Surveys provided a snap-shot of satisfaction with program measures and processes within the first year of program participation (1994 job completions, standard-income weatherization and common-area lighting). The Measures Survey provided a longer view on program measures, taken from two years to a decade later (1986-1993 job completions, low-income plus standard-income weatherization and common-area lighting).

The Measures Survey was performed primarily to collect data for a longitudinal impact evaluation of the Multifamily Conservation Programs. However, key data were gathered in this survey which address the quality of program measures as perceived by program participants after the passing of several years. The Measures Survey thus provides a complement to the shorter-term view of the two Customer Satisfaction Surveys.

### **4.6.1 CHANGES IN BUILDING OCCUPANCY**

The combined samples drawn from program participants for the Measures Survey represent 71% of all program participants during the selected years. Contacted customers who responded to the Measures Survey comprise 79% of those sampled. The Measures Survey therefore represents more than half (56%) of all participants during the selected program years. This high level of representation should lend the reader confidence in the findings of the Measures Survey. However, no formal tests were made of selection bias in the response to this survey.

In 1997, more than half of the units served by the Common-Area Lighting Program were housed in 24 very large City public-housing authority buildings. This shift away from primarily condominium buildings, toward serving public-housing tenants will shift the 1997 Common-Area Lighting profile toward the whole building Low-Income Program's tenant composition. In 1997-1998 the Common-Area Lighting Program is also serving more retirement home project types.

Meanwhile the whole-building Standard-Income Program has also been enrolling significant numbers of City and County public-housing authority projects in recent years. These projects are located within the Seattle City Light service area but outside the Seattle City limits, and/or have resident income guidelines (at 80% of median) higher than those used by the Department of Housing and Human Services (DHHS) to qualify tenants for the Low-Income (whole building) conservation program. Serving public housing projects allows Seattle City Light to make conservation benefits available to citizens in the income "gap



group”, between those able to afford weatherization loans and those in need who turn to the City for bill payment assistance.

At the same time, the whole-building Low-Income Program operated by DHHS with Seattle City Light funding has changed its financial policy. Owners who formerly received full weatherization grants are now required to share 20% of the costs for replacement windows (insulation is still free to owners). According to SCL and DHHS staff, this change has tipped the balance affecting the interests of private-housing owners, some of whom are switching to the standard-income program to avoid signing the DHHS covenant to completely freeze rents in the first year, and not to raise rents due to program improvements for the following two years.

In the late 1990s, the Low-Income Multifamily Program gradually approaches saturation of the available qualifying building stock. Meanwhile, multifamily housing in Seattle is increasingly being upgraded and converted from low-income to nonlow-income status, due to rising land-values and other economic pressures in the City. These developments are blurring the lines between low-income and nonlow-income programs at Seattle City Light. At the same time, in Seattle as across the country, HUD Section 8 covenants promulgated by Housing and Urban Development projects 30 years ago are running out.

The City faces a serious loss of “affordable housing” for low-income and low moderate-income citizens. The present housing shortage, with very low vacancy rates, has also temporarily created an owner’s market with reduced economic incentives on the part of building owners to make physical improvements in their multifamily buildings. The question for Seattle City Light is the role of weatherization and lighting retrofit programs in preserving affordable housing in Seattle.

**Suggested Action:** SCL and DHHS must continue to explore ways to support the ‘affordable housing’ agenda of the City of Seattle, while maintaining and improving the energy efficiency of existing building stocks. Eventual restructuring of the low-income and non-low income programs may become necessary in the long-term future. This will open up issues formerly tied to the low-income programs, such as funding or financing for rehabilitation, remodelling, and repairs, as well as code compliance and efficiency improvements.

#### **4.6.2 CHANGES IN HOUSE METER LOADS**

Multifamily buildings typically experience little to no change in house meter loads over time. This suggests that energy savings from program measures will be persistent and stable over time from efficiency measures affecting house meter loads, subject to normal operations and maintenance (O&M) and the natural failure rates of installed equipment.

As noted regarding building occupancy characteristics by program, the distinction among programs based on typical house meter loads may be blurred in recent and upcoming years. While few condominiums are served by the weatherization programs, buildings with low-income and low-moderate income (public housing) tenants are increasingly being served in the Seattle City Light programs rather than by DHHS. The primary target of the Common-Area Lighting Program continues to be condominiums and older gas-heated multifamily buildings.

**Suggested Action:** None.

#### 4.6.3 CHANGES IN TENANT METER LOADS

The level of replacement activity for water heaters, refrigerators, dishwashers and ranges shows that many multifamily building owners and property managers invest in electric appliances. Seattle City Light has an interest in ensuring that replacement water heaters meet high efficiency standards.

A barrier which the program may need to overcome is the non-availability of suitable water heater models, e.g., squat under-counter 40-gallon tanks. Manufacturers currently have little incentive to design a high-efficiency model, and the current trend is toward tall, skinny 40-gallon tanks.

**Suggested Action:** The Utility should seek out multifamily participants via the Energy Efficient Water Heater Program (EEWHRP). The Utility may also want to note water heater replacement dates in the Conservation Tracking System, to ensure that future replacements (when measure lifetimes expire) are also made with high-efficiency equipment.

The Utility should consider devising a strategy to encourage bulk replacement of all tanks in multifamily buildings, rather than individual spot replacements.

In 1997-1998, Seattle City Light is offering the regional WashWise Program to encourage purchase of high-efficiency tumble action washers. This program is sponsored by the Northwest Energy Efficiency Alliance. Multifamily buildings with common-area laundries typically have coin-operated laundry machines, which are provided by a limited number of vendors in the Seattle area.

**Suggested Action:** Common-area laundries in multifamily buildings may provide a good target for the WashWise program in 1998, based on water and waste-water (sewer) savings to owners, who typically pay these master-metered bills. Refrigerators, in-unit laundries, and electric dish washers also present a potential target for Utility programs designed to encourage the installation of high-efficiency models.

#### 4.6.4 PROBLEMS WITH PROGRAM MEASURES

After asking building owners and property managers about changes to their buildings in loads and features, each was given the opportunity to comment on the measures installed by the program in which the sample building participated. The final question of the survey asked, “have any problems related to the measures installed cropped up in this building since the weatherization (lighting) work was done?” Since the survey was focused on changes affecting energy use, for input to regression equations for the impact analysis, this question was added mainly to provide closure. However, the findings provide food for thought, specifically about the window measures selected and installed by the program.

Standard-Income Program files were researched to link problem comments to the type of windows installed, manufacturer, and installing contractor. The following patterns emerged:

1. Problems with “broken seals and condensation,” leading to the need for post-program replacements, are associated with aluminum-framed windows installed in 1987-1989. The projects included both full replacements (glass plus frame) and window conversions (where double-paned glass is installed in existing frames).
2. Jobs eliciting comments about “poor installation” are also associated with aluminum windows installed during 1988-1989, both replacements and conversions.
3. Comments about “defects and poor quality,” by contrast, clustered among buildings where vinyl replacement windows were installed during 1989-1991 (and one in 1986).
4. Problems with water and air “leakage around windows” requiring post-program replacements, presumably under warranty, occurred as the result of 1991-1992 vinyl-window installations. Most of these windows were full replacements installed by a single contractor.

In the cases of leakage around windows, the question is whether the window product or the installation method could be responsible. In the single-family weatherization programs, a limited number of windows are installed, each individually measured. In multifamily buildings, larger numbers are mass produced to uniform measurements. Replacement windows are bound to fill openings that are not as uniform, with varying degrees of gaps to be filled. The program specifications require “drip caps” for all installed windows, and program inspectors verify that each finished window has either a nailing flange or flashing along the top edge, where there is no overhang. Caulking, filler, and trim materials are to be sloped to ensure water run-off. Screw penetrations are to be sealed, and caulking is applied around the outside edge of window frames.

SCL program auditors document pre-existing leakage and stains, because pre-existing wall problems can cause leakage to continue, independently of the window replacements. For example, one contractor

brought in a structural engineer to establish that leakage at the stucco building in question was not related to the program's window replacement. Staff are firm in their belief that generally the cause of air and water leakage is faulty or degraded wall construction, which cannot be remedied by the window retrofit itself. They do say, however, that customers typically "blame the last one who touched the building."

Seattle City Light, in developing its conservation programs, has attempted to lead the market toward more efficient building practices in new construction, and to retrofit existing buildings with high-efficiency shell improvements. An unwanted side effect to these market transformation efforts has been the early installation of some early-generation window and lighting products that had not yet achieved their full promise.

During the early years of the Multifamily Conservation Programs (1986-1987 pilot and 1988-1989 full-scale program), apparently the available aluminum-framed windows did not all have durable double-pane seals. Whether the seals broke due to inadequate manufacturing, or due to handling and installation stresses, many have required replacement over subsequent years. Early aluminum windows did not have effective thermal breaks, and the frame material itself transmitted more heat (cold) than the earlier generation of wood windows. It has been argued that, compared to wood frames, aluminum frames distort under the weight of the glass, can torque when handled (potentially breaking seals between panes), and can get dented or damaged in handling. Vinyl frames, by comparison, do not dent, can have better structural integrity, and can be stronger and more flexible (protecting between-pane seals). Fortunately, in the 1990s the program moved away from aluminum frames as more efficient vinyl windows were developed, with rare gas fills and wider "dead-air spaces." It appears, however, that the early vinyl windows themselves were not entirely without quality problems, based on comments about product defects.

**Suggested Action:** Seattle City Light needs to develop a strategy for following-up on specific buildings receiving the current generation of vinyl window products, to determine whether problems observed in 1991-1992 windows have "shaken out" as high-efficiency ( $U \leq 0.40$ ) products matured.

A strategy should also be developed for follow-on services to 1997-1998 customers.

The Utility might even consider investigating the economics of offering a new generation of vinyl replacement windows, at some future time, to customers who participated in the Multifamily Conservation Programs in 1986-1990 when aluminum windows were sponsored.

There remains the question why participants in the 1991-1992 Low-Income Program volunteered statements on far fewer post-installation problems with windows. The Department of Housing and Human Services, which operates the Low-Income Program, does require foam to be installed over the old

aluminum frame perimeter; this may serve to reduce some drafts, water leakage, and thermal transmission. DHHS also provides this weatherization program in conjunction with rehabilitation services, which address structural deficiencies that could lead to leakage, funded by State sources and other agencies.

**Suggested Action:** Seattle City Light should consider, where window sills have deteriorated, how rehabilitation could be incorporated into the 1999-2000 Standard-Income program to increase the quality of window retrofits, the building stock, and ultimately the satisfaction of building owners.

The two City Departments should also consider the extent to which a process which emphasizes low (competitive) bids has contributed to post-program window problems in the Standard-Income Program.

#### 4.6.5 INSTALLATION OF NON-PROGRAM MEASURES

An 11% window replacement rate was observed over a six-year post-program period among Standard-Income Program participants. This rate is likely to fit the expected failure curve, based upon a 30-year average lifetime. Then the question becomes more a matter of why owners and managers of Low-Income Program participant buildings did not notice or report window failures at the expected 6% rate (50%/30 years x 3.5 years).

**Suggested Action:** The Utility should pursue the question of why participants in the 1991-1992 Low-Income Program volunteered statements on far fewer post-installation problems with windows. SCL program staff feel that in recent years the rate of warranty replacements for vinyl windows has been significantly lower than for the preceding aluminum and early-generation vinyl windows. This hypothesis invites testing.

It is reasonable to assume that contractors and manufacturers embed into the original price of products their projected cost of warranty replacements. Postulating a 1.7% annual failure rate, and a glass insert replacement cost of perhaps 2/3 the original window cost (which included the frame as well), warranty replacements could add about 1% per year to the original cost, incurred over the life of the warranty. A ten-year warranty might add nearly 11% to original prices, while a "lifetime" warranty could add 34%, assuming a 30-year lifetime for the typical window. Of course, some contractors and manufacturers do not stay in business that long, and not all building owners seek out warranty replacement for failed window units. Nonetheless, when contractors compete on low-cost bids, length of warranty liability is one of the limiting factors.

Since it appears that post-program replacements in the Standard-Income group reflect roughly what might be expected from a natural flat-rate of product failures, it is possible that similar failures are being overlooked in former participants of the Low-Income Program.

**Suggested Action:** Seattle City Light should consider a strategy to follow up on specific buildings receiving post-program replacements, to find out whether the new windows actually were “less efficient,” as some owners and managers perceive them. Perhaps a focus group of DHHS and SCL program staff should address the issues of rehabilitation and window installation methods. This group could also compare staff insights into customer perceptions about the presence or absence of window problems.

Survey 3 has raised some unanswered questions that should be explored with windows installed during the past five years (1993-1997), to ensure that program quality standards are upheld. What is more, Seattle City Light is left with a long-term concern about aluminum frame windows that were installed during the 1980s, not only in multifamily buildings but also in the single-family/multiplex sector. It may not be cost-effective at this time to introduce a *re-retrofit* program, but the Utility has been in the weatherization business since 1981 for single-family homes and 1986 for multifamily buildings; many program measures are already 12 to 18 years old. The 30-year median residual life of windows implies that many windows will naturally have failed by now (up to 20-30%).

**Suggested Action:** By the year 2001, the Utility should consider developing a new kind of spot-replacement rebate program that could help homeowners and multifamily building owners to re-fit high-efficiency windows into openings where individual aluminum framed windows have failed. As a rebate alternative, lending institutions are becoming more active in offering below-market rate energy loans, with money now readily available. The design of such a streamlined new-generation program would be challenging, to ensure cost-effectiveness, but it is time the Utility considered next steps as the lifetimes of sponsored window retrofits tick away.

#### **4.7 Use of Minority or Women-Owned Contractors**

Customers from both waves and all measures seem agreed that the paramount criteria in choosing a WBE or MBE contractor are quality, price, and a competitive bid. Following that in importance, clearly, is knowing which contractors qualify as WBE or MBE. Reputation and location are crucial to far fewer customers in the Multifamily Conservation Programs. These findings suggest that the program operators can best further the City's goals for minority and women-owned businesses by ensuring their capacity to compete on price and by publicizing their availability.

In 1997 there were still no women- or minority-certified contractors in the Seattle area qualified to install lighting measures (one minority electrical contractor has been subcontracting work through a majority-owned electrical firm). Because the programs specify new fixtures, which involves rewiring, the measures fall under State and City electrical codes that require a licensed electrician to perform the installation. Even changing out ballasts from one type to another requires a licensed electrician (while replacing a ballast with the same type apparently does not).

As of late 1997, job-specific permits from the Department of Construction and Land Use (DCLU) in Seattle are required for lighting fixture replacements. Acquiring a permit for each job will add a fee of \$35 plus \$0.90 per fixture, extra time to wait in lines to take out each permit, and more time on the job to schedule and attend SCL and DCLU inspections — in addition to more paperwork for contractors.

One factor working against the success of WBE/MBE contractors at obtaining bids has been the presence in the service area of one large competitor which not only installed windows but also manufactured them locally as well. This created a real cost advantage and generated higher sales volumes, since price and competitive bids lead the way in customer decisions. Recent events in 1998 will change this situation. The local company, bought out by a national firm, has withdrawn from the retrofit market. Other local window-installers will be screened by the program for their qualifications to take up the slack in project volumes.

Another factor that works against WBE/MBE contractors in competing for weatherization jobs is their size and access to credit. These contractors provide a lower volume of business, however, and the manufacturers were not willing to cut special deals for them.

A third factor, which has changed over time, reflects bidding strategies among the contractors who must purchase windows from manufacturers. Some contractors submitted combined bids for insulation plus windows, “under-bidding” the insulation component. Now contractors periodically specify that insulation bids are conditional upon receiving the weatherization combined job.

All these factors make it difficult for the WBE and MBE contractors to compete. The policy question for Seattle City Light has been, what is the extent of the City’s role in tinkering with mechanisms of the free marketplace? Through the Multifamily Conservation Programs, Seattle City Light is a third party to agreements between customers and contractors. While the City attempted to assist contractors to compete on price, by intervening with manufacturers, this strategy fell apart. The City can, however, continue to publicize the availability of qualified WBE/MBE contractors to program participants.

Another action which may help small contractors with cash-flow issues may fall out from proposed program changes for 1998-1999. One option is to de-emphasize and scale back the SCL Multifamily loan program, turning the financial role wherever possible over to the banking industry. Customers who have taken this route on their own report that banks can flow cash to the contractors virtually overnight, which compares very favorably against SCL’s slower processes, which can take up to 30 days to finalize payment. The banking industry is best capable of processing customer loans, and it may be time for Seattle City Light to step out of this role, in the interest of both customers and contractors. The disadvantage to this alternative is that customers would no longer benefit from the zero-percent interest option extended by SCL loans. Program planners have suggested the alternative of changing SCL loan program provisions. One such change is to encourage more customers to take the cash discount option

rather than the loan option; another is to implement an 'early decision' incentive to more jobs along more promptly.

**Suggested Action:** City Light and DHHS should continue to publicize the availability of qualified WBE/MBE contractors to program participants.

Beginning in 1998, City Light should de-emphasize the loan program, modifying program provisions to encourage increased use of the early-payment discount option, to reduce the proportion of loans carried by the City.



## **Appendix A: Survey Instruments**

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### ***A.1. Customer Satisfaction Survey, Wave 2 Form***



## A.2. Measures Survey

### Multifamily Conservation Program Impact Evaluation Measures Telephone Survey

Hello, this is [Interviewer Name] calling from HBRS on behalf of Seattle City Light. *[IF THEY ASK FOR SOMEONE TO CONTACT AT SCL -- DEBRA TACHIBANA (206) 684-3874.]*  
I would like to speak with [insert Contact Name]. Is he/she available?

#### INTRODUCTION: PARTICIPANT SAMPLES

---

Our files show that the multifamily building at **[insert Service Address]** participated in our **[weatherization / common-area lighting]** program in **[insert Participation Year]**. We show your name as the primary contact person when that work was done, or as the new building owner or manager.

Right after the Thanksgiving holiday you were sent a letter of introduction from Debra Tachibana, who is a Program Evaluator at Seattle City Light. I hope you got that letter which explains why we are calling.

[Pause for feedback. Offer to have a second copy of the letter sent for their records, if it didn't arrive. Confirm the name, address, and zipcode for correct delivery. Record this information in comment field.]

We are in the process of evaluating the effectiveness of the Multifamily **[Conservation / Common-area Lighting]** Program, which has been operating since **[1986 / 1993]**. Ms. Tachibana is doing a statistical analysis of energy use in Program buildings before and after weatherization. As part of this effort, I would like to ask you a few questions about changes that may have occurred at this building during the years from **[insert Participation Year -1]** through **[1993 / 1994]**.

Could you please take a few minutes to answer some questions at this time?

- 1      PROCEED    --->    skip to confident
- 3      CALLBACK
- 5      NEED ANOTHER COPY OF THE LETTER
  
- 9      REFUSED

## INTRODUCTION: NON-PARTICIPANT SAMPLE

---

In December you were sent a letter of introduction from Debra Tachibana, who is a Program Evaluator at Seattle City Light. I hope you got that letter which explains why we are calling.

[Pause for feedback. Offer to have a second copy of the letter sent for their records, if it didn't arrive. Confirm the name, address, and zipcode for correct delivery. Record this information in comment field.]

City Light is doing a study of insulation, windows, and lighting fixtures in apartment and condominium buildings. Our billing records show that you own or manage a multifamily building at **[insert Service Address]**. We show your name as the primary contact person for that building.

We would very much like to include information about your building in our study. Ms. Tachibana is doing a statistical analysis of energy use in buildings like yours.

As I said, we are evaluating changes to the efficiency of insulation, windows, and lighting. As part of this effort, I would like to ask you a few questions about changes that may have occurred at your building between 1985 and 1993. This interview would take about 5 to 10 minutes.

Could you please take a few minutes to answer some questions at this time?

- 1      PROCEED    --->    skip to confident
- 3      CALLBACK
- 5      NEED ANOTHER COPY OF THE LETTER
  
- 9      REFUSED

## CONFIDENT: ALL CASES

---

I can assure you that your answers to these questions will remain confidential.

[PARTICIPANTS: They will not be reported back to Program staff unless you request some follow-up.]

Your responses will just be coded and included in statistics about energy use by groups of buildings.

# BACKGROUND: NON-PARTICIPANT SAMPLE

---

Let's start with a little background information.

- 1a. Has this building ever had insulation, windows, or lighting installed by a utility weatherization program?

1 YES  
3 NO

In what year was that? 19 \_\_\_\_

Were the measures installed by Seattle City Light or Washington Natural Gas?

1 SEATTLE CITY LIGHT  
3 WASHINGTON NATURAL GAS (WASHINGTON ENERGY SERVICES)

# COMMON QUESTIONS: ALL CASES

---

1. How many tenant units are there in the building at **[Service Address]**?  
\_\_\_\_\_ UNITS

2. Has this number of tenant units changed since **[Participation Year -1][1985]**?

1 YES  
3 NO

How many units were there before the change? \_\_\_\_\_

In what year did this change occur? 19 \_\_\_\_

3. I will read off several categories to you that describe the mix of tenants now living in this building. Please tell me what proportion of tenants fall into each category?

Families with children	_____	%
Students	_____	%
Elderly	_____	%
Other types of tenants	_____	%
	100 %	

4. Has the mix of tenants changed over time

1 YES  
3 NO ---> SKIP TO Q5

What would you say the mix of tenants was in **[Participation Year -1][1985]**?

Families with children	_____	%
Students	_____	%
Elderly	_____	%
Other types of tenants	_____	%
	100 %	

5. Have you removed, added, or changed out any of the following major **electrical** appliances in the **individual tenant** units since **[Participation Year -1][1985]**?

- 1 REMOVED  
3 ADDED  
5 CHANGE-OUT  
7 NONE

	Year Done	%Units affected
Clothes Washer	19____	____%
Clothes Dryer	19____	____%
Dish Washer	19____	____%
Water Heater	19____	____%

What type of system did they replace?

- 1 NON-ELECTRIC CENTRAL SYSTEM  
3 ELECTRIC CENTRAL SYSTEM  
5 NON-ELECTRIC INDIVIDUAL TENANT WATER HEATERS

Other 19\_\_\_\_ %  
(please describe) \_\_\_\_\_

6. Now I will read off a list of types of electrical equipment that could be served by your house meter. (This is the commercial account billed to the owner or property manager). Please tell me which equipment you presently have in the common areas of this building, equipment that you believe is wired to a housemeter.

- 1 YES, HAVE IN COMMON AREAS  
3 NO

Clothes Washers	____	Exterior Lights	____
Clothes Dryers	____	Interior Lights	____
		(in common area)	____
Laundry Water Heaters	____	Elevator(s)	____
Tenant Water Heaters	____	Swimming Pool Pump(s)	____

Other (DESCRIBE): \_\_\_\_\_

7. Has the common area **space** served by your house meter(s) changed in square footage since **[Participation Year -1][1985]**?

- 1 YES, INCREASED  
3 YES, DECREASED  
5 NO ----> skip to Q8

In what way? \_\_\_\_\_

In what year did this occur? 19\_\_\_\_

How many square feet were involved, as a proportion of the building total before the change? \_\_\_\_\_ %

8. Have the common area **functions** served by your house meter(s) changed since **[Participation Year -1][1985]**? That is, has the total amount of electrical equipment on the house meters changed since that year?

1 YES, INCREASED ----> skip to Q8a

3 YES, DECREASED ----> skip to Q8b

5 NO ----> skip to Q9

- 8a. In what way have they increased?

Electric equipment added:	In what year?
_____	19__
_____	19__
_____	19__
_____	19__
_____	19__

- 8b. In what way have they decreased?

Electric equipment taken off housemeter:	In what year?
_____	19__
_____	19__
_____	19__
_____	19__
_____	19__

MEASURE CHANGES: NON-PARTICIPANT SAMPLE

---

9. City Light is interested in knowing if you have added or changed any lighting fixtures in the **common areas** of this building.

9a. Have you added or changed-out any **outdoor** Lighting Fixtures or Bulb types? \_\_\_\_

- 1 NO
- 3 ADDED
- 5 CHANGE-OUT

Is the new Fixture or Bulb type more efficient than what was in there before?

- 1 YES
- 3 NO

When was that done? 19\_\_\_\_

What portion of the **Lighting** is new / was changed out? \_\_\_\_ %

9b. Have you added or changed-out any **interior** Lighting Fixtures or Bulb types? \_\_\_\_

- 1 NO
- 3 ADDED
- 5 CHANGE-OUT

Is the new Fixture or Bulb type more efficient than what was in there before?

- 1 YES
- 3 NO

When was that done? 19\_\_\_\_

What portion of the **Lighting** is new / was changed out? \_\_\_\_ %

10. City Light is also interested in knowing if you have added or changed out the showerheads or windows in the **tenant units** of this building.

10a. Have you added or changed-out any **Showerheads**? \_\_\_\_

- 1 NO
- 3 ADDED
- 5 CHANGE-OUT

Is the new Showerhead more efficient than what was in there before?

- 1 YES
- 3 NO

When was that done? 19\_\_\_\_

What portion of the **units** got the Showerheads? \_\_\_\_ %



10b. Have you added or changed-out any **Windows** to Double-Paned glass? \_\_\_\_

- 1 NO
- 3 ADDED
- 5 CHANGE-OUT

Are the affected Windows more efficient than what was in there before?

- 1 YES
- 3 NO

When was that done? 19\_\_\_\_

What portion of the **units** got the Windows? \_\_\_\_\_ %

THANK YOU VERY MUCH for your time. Your answers will be quite helpful in this evaluation study.

PROGRAM MEASURE PERSISTENCE: PARTICIPANT SAMPLE

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9. City Light is interested in knowing if the measures installed by the Program in the **common areas** are still in place. Can you tell us if the following equipment has been **removed** and **not replaced** with equipment of similar efficiency? (Please feel free to answer this question frankly.)

- 9a. Efficient **exterior** (outdoor) Light Fixtures and Bulbs?

1 YES, REMOVED  
3 NO ----> skip to Q9b

How many were removed? \_\_\_\_\_  
What proportion is this of the measures originally installed  
by the Program? \_\_\_\_\_ %  
In what year were they removed? 19\_\_\_\_

- 9b. Efficient **interior** Light Fixtures and Bulbs?

1 YES, REMOVED  
3 NO ----> skip to Q9b

How many were removed? \_\_\_\_\_  
What proportion is this of the measures originally installed  
by the Program? \_\_\_\_\_ %  
In what year were they removed? 19\_\_\_\_

10. City Light is also interested in knowing if the measures installed by the Program in the **tenant units** are still in place. Can you tell us if the following equipment has been **removed** and **not replaced** with equipment of similar efficiency? (Again, please feel free to answer this question frankly.)

- 10a. Efficient-flow Showerheads?

1 YES, REMOVED  
3 NO ----> skip to Q9b

How many were removed? \_\_\_\_\_  
What proportion is this of the measures originally installed  
by the Program? \_\_\_\_\_ %  
In what year were they removed? 19\_\_\_\_

## 10b. Double-pane Windows?

- 1 YES, REMOVED  
3 NO ----> skip to Q9b

How many were removed? \_\_\_\_\_

What proportion is this of the measures originally installed  
by the Program? \_\_\_\_\_ %

In what year were they removed? 19\_\_\_\_

## 11. Lastly, have any problems related to the measures installed cropped up in this building since the weatherization work was done?

- 1 YES  
3 NO ----> skip to thank-you

Could you please describe that: \_\_\_\_\_  
\_\_\_\_\_

Would you like a City Light staff person to call you to follow-up on this problem?

- 1 YES  
3 NO ----> skip to thank-you

THANK YOU VERY MUCH for your time. Your answers will be quite helpful in this evaluation study.



## **Appendix B: Descriptive Statistics (in separate binder)**

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